(3) Connect hydraulic pressure line to the top port of accumulator; leave fitting loose.

(4) Install accumulator retaining clamps.

(5) Tighten hydraulic line fitting connected in step (3) preceding.

(6) Connect air filler valve and gage assembly to bottom port of accumulator.

(7) Charge MLG brake accumulator with dry filtered air or nitrogen (refer to Chapter 12, SERVICING).

(8) Remove warning tag and close the HYD PUMP MOTOR CONT circuit breaker.

(9) Pressurize No. 2 hydraulic system (refer to Chapter 29, HYDRAULIC POWER). Bleed accumulator and brake lines by depressing brake pedals approximately ten times.

(10) Check around air filler valve and pressure gage for air leaks with bubble fluid, Specification MIL-L-25567. Also check for hydraulic leaks. Repair leaks if any and repeat test.

(11) When test results are satisfactory, remove bubble fluid residue with a clean, water-dampened cloth.

## LANDING GEAR BRAKE METERING VALVES - MAINTENANCE PRACTICES

1. Removal/Installation MLG Brake Metering Valves (see Figure 201)

A. Equipment Required - None.

B. Preparation.

(1) Reduce hydraulic pressure to 0 psig (refer to Chapter 12, SERVICING).

(2) Open and attach warning tag to the HYD PUMP MOTOR CONT circuit breaker, on main circuit breaker panel.

C. Remove MLG Brake Metering Valve.

(1) Gain access to MLG brake metering valve to be removed. Valves are located on forward bulkhead of the hydraulic compartment.

(2) *For Group II airplanes, back off turnbuckle on the brake pedal relief spring, above applicable MLG brake metering valve, to relax spring tension.

WARNING: DO NOT PROCEED WITH METERING VALVE REMOVAL UNLESS STEP (2), PRECEDING, HAS BEEN ACCOMPLISHED.

(3) Disconnect clevis rod from lever on brake metering valve.

(4) Identify and disconnect three hydraulic lines from brake metering valve.

(5) Remove four mounting bolts and nuts; remove MLG brake metering valve from support bracket.

NOTE: Remove fittings from valve and hold for installation on replacement valve; discard "O" Rings.

D. Install MLG Brake Metering Valve.

(1) Install fittings in ports of replacement brake metering valve. Use new "O" rings for installation. ("O" rings must be soaked in Skydrol 500A hydraulic fluid prior to installation.)

(2) Support brake metering valve in correct position on mounting bracket and secure with four mounting bolts and nuts.

(3) Connect three hydraulic lines to brake metering valve, as identified in step C.(4).

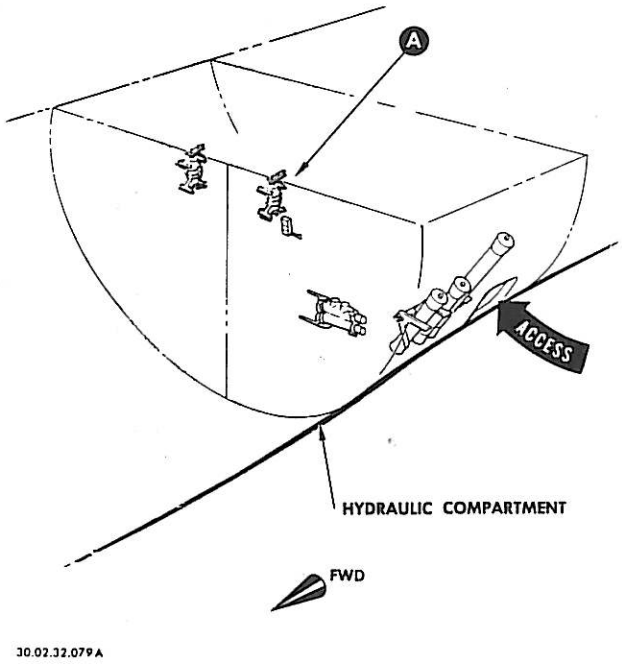
(4) Temporarily connect clevis rod to lever on metering valve with bolt and nut.

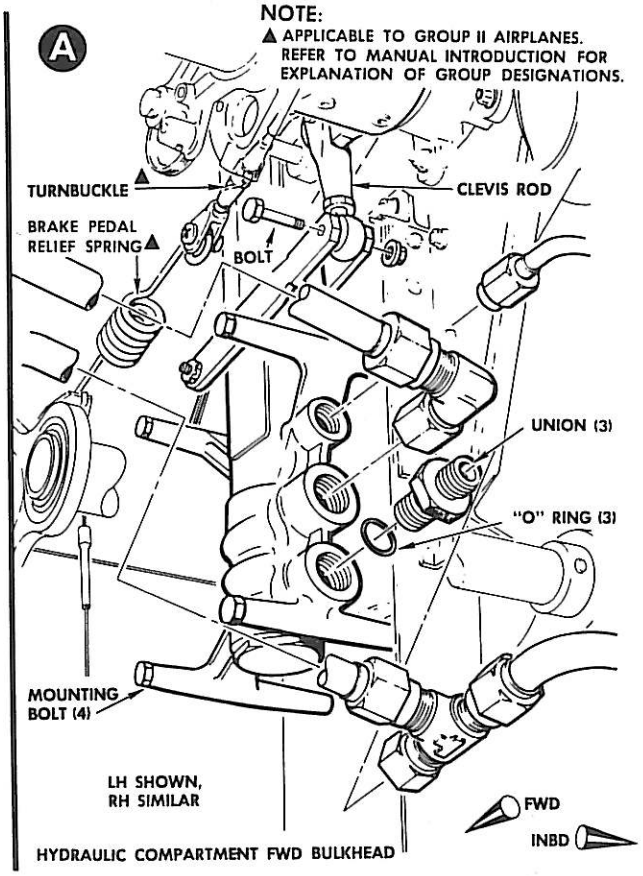
(5) Remove warning tag and close HYD PUMP MOTOR CONT circuit breaker.

(6) Perform Adjustment/Test Brakes - Bleeding Procedure (refer to 32-8-0) and check metering valve for leaks.

NOTE: Only the brakes downstream of replaced metering valve need be bled.

*Refer to Manual INTRODUCTION for Explanation of Group Designations.




Main Landing Gear Brake Metering Valve Installation
Figure 201

(7) Perform Adjustment/Test Normal Brake Controls - Rigging and Adjustment (refer to 32-8-0).

NOTE: If the MLG brake metering valve only has been replaced and no other rigging or adjustment has been changed, adjustment can be accomplished per 32-8-0, steps 1.B.(9), 1.B.(10), 1.B.(11), 1.C.(2) (for applicable MLG brake metering valve), and 1.C.(7) (for applicable MLG brake metering valve) thru 1.C.(13). Operation can be checked per 32-8-0, steps 4.B.(13) thru 4.C.(7), 4.D.(1), 4.D.(2), 4.D.(5), and 4.D.(7).

2. Removal/Installation NLG Brake Metering Valve (see Figure 202)

A. Equipment Required - None.

B. Preparation.

(1) Reduce hydraulic pressure to 0 psig (refer to Chapter 12, SERVICING).

(2) Open and attach warning tag to the HYD PUMP MOTOR CONT circuit breaker, on main circuit breaker panel.

C. Remove NLG Brake Metering Valve.

(1) Gain access to the NLG brake metering valve in nose wheel well. The valve is mounted on wheel well ceiling.

(2) Identify and disconnect three hydraulic lines from NLG brake metering valve.

(3) Remove three mounting bolts, spacers, washers, and nuts; remove metering valve.

NOTE: Remove fittings from valve and hold for installation on replacement valve; discard "O" rings.

D. Install NLG Brake Metering Valve.

(1) Install fittings in ports of replacement brake metering valve. Use new "O" rings for installation. ("O" rings must be soaked in Skydrol 500A hydraulic fluid prior to installation.)

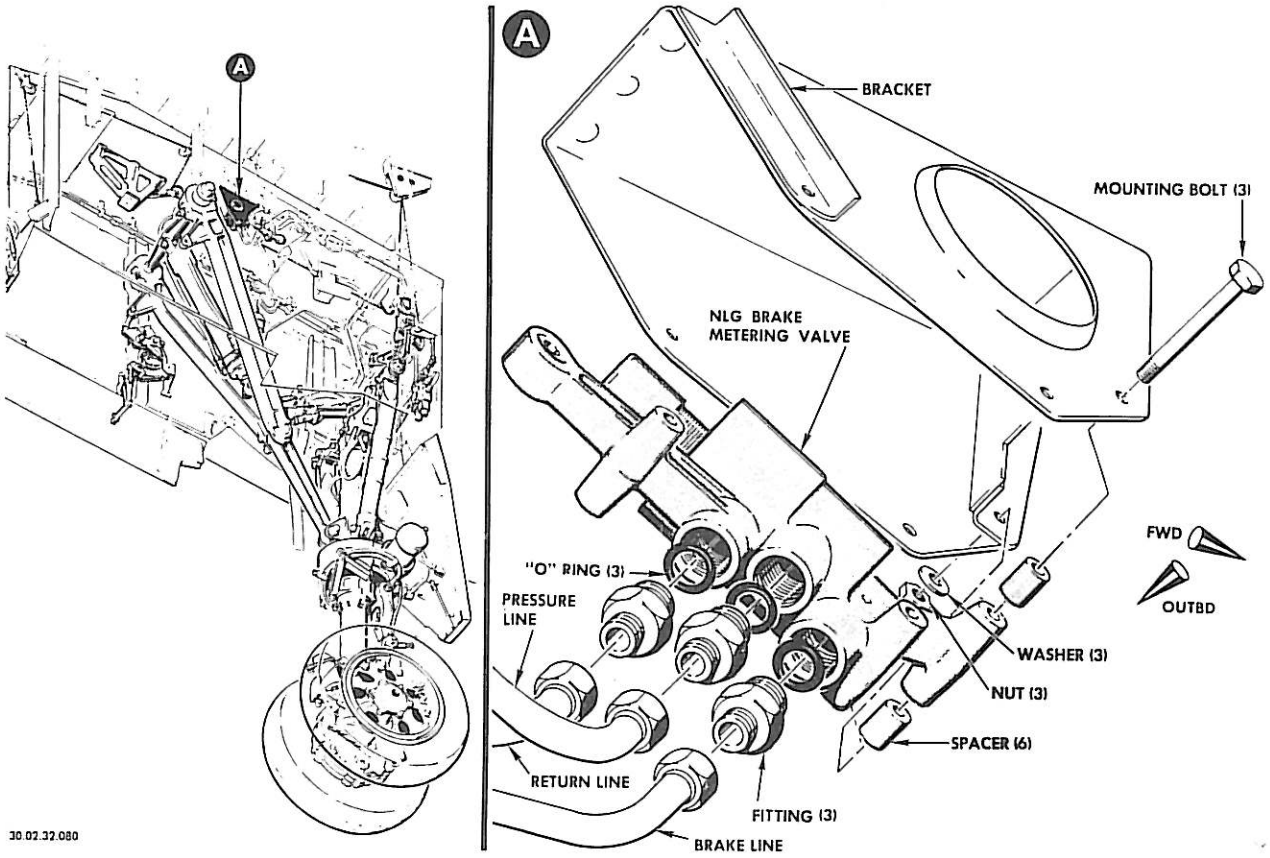
(2) Install NLG brake metering valve in correct position with three mounting bolts, spacers, washers, and nuts.

(3) Connect three hydraulic lines to metering valve, as identified in step C.(2).

(4) Remove warning tags and close HYD PUMP MOTOR CONT circuit breaker.

(5) Perform Adjustment/Test Brakes - Bleeding Procedure (refer to 32-8-0) and check metering valve for leaks.

(6) Perform Adjustment/Test Normal Brake Controls - Rigging and Adjustment (refer to 32-8-0).




Nose Landing Gear Brake Metering Valve Installation
Figure 202

NOTE: If the NLG brake metering valve only has been replaced and no other rigging or adjustment has been changed, no rigging or adjustment is required if operational check is satisfactory. Check operation per 32-8-0, steps 4.B.(3), 4.B.(5) (NLG only), 4.B.(9), 4.B.(11) thru 4.B.(15), 4.C.(7), 4.D.(1), 4.D.(2), 4.D.(5), and 4.D.(7) (NLG only).

## LANDING GEAR BRAKE ANTISKID CONTROL VALVES - MAINTENANCE PRACTICES

1. Removal/Installation MLG Antiskid Control Valves (see Figure 201)

A. Equipment Required - None.

B. Preparation.

(1) Reduce hydraulic pressure to 0 psig (refer to Chapter 12, SERVICING).

(2) Open and attach warning tags to the following circuit breakers, on main circuit breaker panel:

ANTI-SKID MAIN POWER, CONT, and WARN.

HYD PUMP MOTOR CONT.

C. Remove MLG Antiskid Control Valve.

(1) Gain access to MLG antiskid control valve to be removed. The valves are mounted on forward side of MLG beam in main wheel wells.

(2) Disconnect four hydraulic lines from antiskid control valve.

(3) Disconnect electrical harness.

(4) Remove three mounting bolts, washers, and nuts and remove control valve.

NOTE: Remove fittings from ports of control valve and hold for installation on replacement valve; discard "O" rings.

D. Install MLG Antiskid Control Valve.

(1) Install fittings in ports of replacement valve. Use new "O" rings for installation. ("O" rings must be soaked in Skydrol 500A hydraulic fluid prior to installation.)

(2) Install antiskid control valve in correct position on MLG beam and secure with mounting bolts, washers, and nuts.

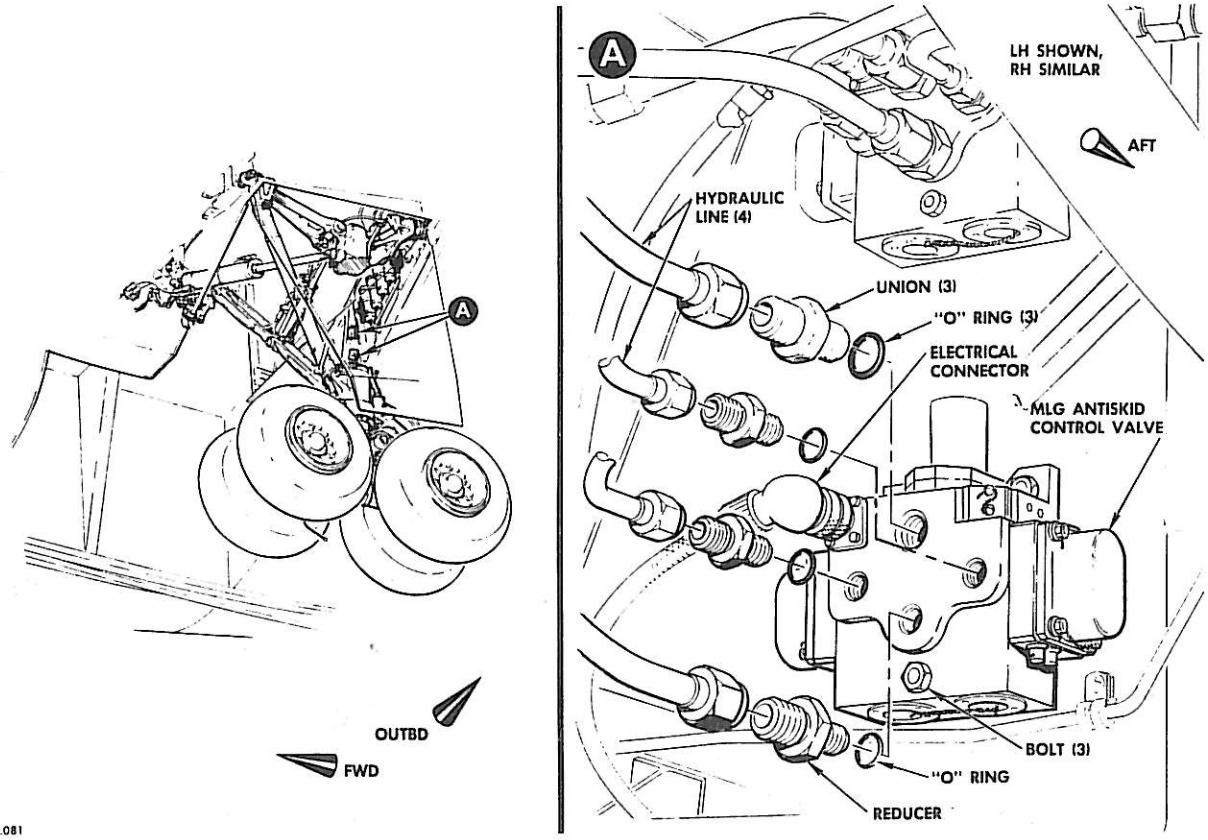
(3) Connect electrical harness to control valve.

(4) Connect hydraulic lines to control valve.

(5) Remove warning tags and close circuit breakers opened in step B.

(6) Bleed MLG brake hydraulic system (refer to 32-8-0) and check antiskid control valve for leaks.

NOTE: Only the brakes downstream of replaced antiskid control valve need be bled.




Main Landing Gear Antiskid Control
Valve Installation
Figure 201

(7) Perform Adjustment/Test Antiskid System - Functional Check (refer to 32-8-0).

NOTE: If only a MLG antiskid control valve has been replaced and no other rigging or adjustment has been changed, operation can be checked per 32-8-0, steps 5.B.(1)(for applicable MLG wheels), 5.B.(3) thru 5.B.(7), 5.B.(11), 5.B.(12), 5.D. (for applicable MLG wheels), 5.F. (excluding NLG checks), 5.H.(2) thru 5.H.(4), 5.H.(6), and 5.H.(7).

2. Removal/Installation NLG Antiskid Control Valve (see Figure 202)

A. Equipment Required - None.

B. Preparation.

(1) Reduce hydraulic pressure to 0 psig (refer to Chapter 12, SERVICING.)

(2) Open and attach warning tags to the following circuit breakers, on main circuit breaker panel:

ANTI-SKID NOSE POWER.

HYD PUMP MOTOR CONT.

C. Remove NLG Antiskid Control Valve.

(1) Gain access to the NLG antiskid control valve in the nose wheel well, left side.

(2) Identify and disconnect three hydraulic lines from antiskid control valve.

(3) Disconnect electrical harness from control valve.

(4) Remove three mounting bolts and washers; remove antiskid control valve.

NOTE: Remove fittings from ports of control valve and hold for installation on replacement valve; discard "O" rings.

D. Install NLG Antiskid Control Valve.

(1) Install fittings in ports of replacement valve. Use new "O" rings for installation. ("O" rings must be soaked in Skydrol 500A hydraulic fluid prior to installation.)

(2) Install antiskid control valve in correct position on bracket and secure with mounting bolts and washers.

(3) Connect hydraulic lines to control valve, as identified in step C.(2).

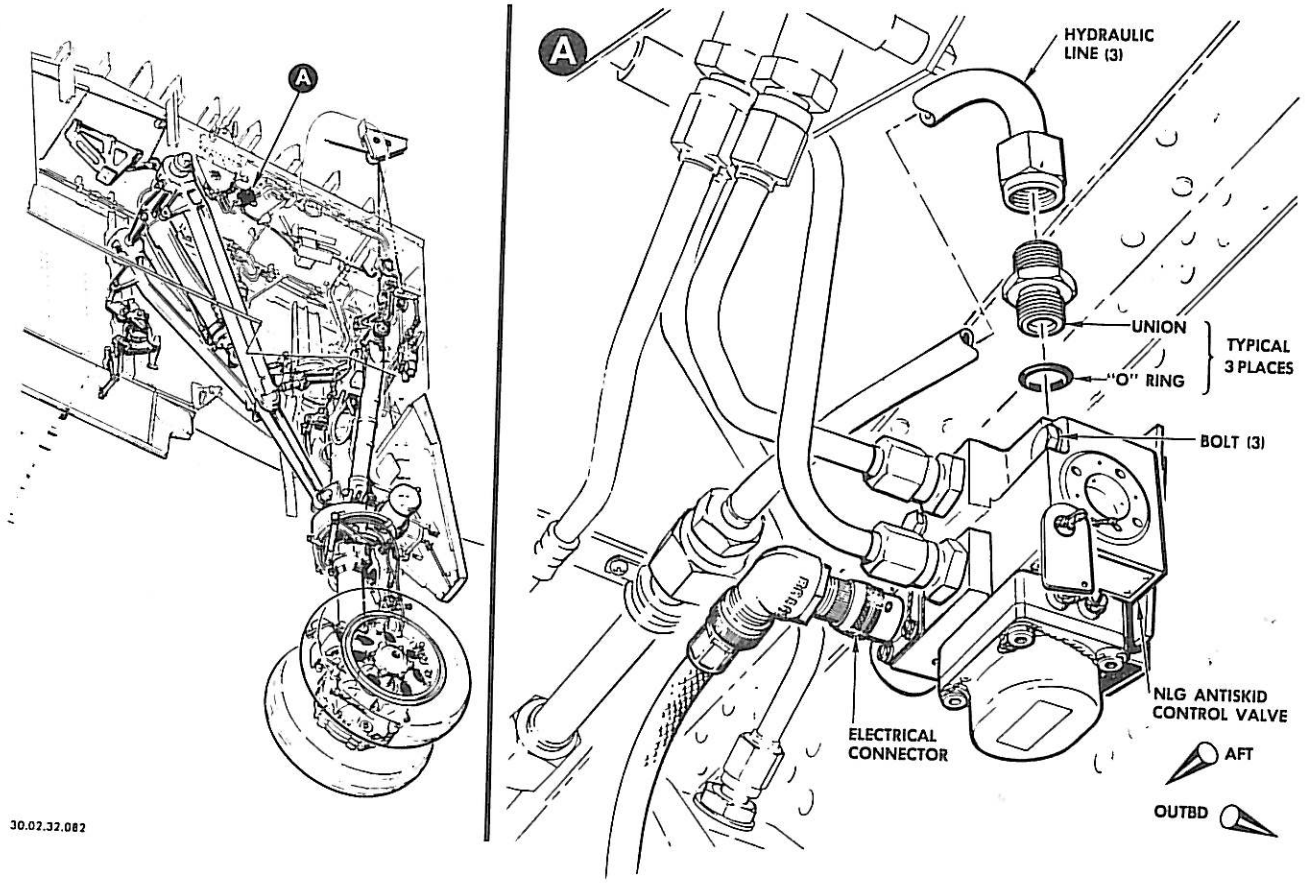
(4) Connect electrical harness to control valve.

(5) Remove warning tags and close circuit breakers opened in step B.

(6) Bleed NLG brake hydraulic system (refer to 32-8-0) and check antiskid control valve for leaks.

(7) Perform Adjustment/Test Antiskid System - Functional Check (refer to 32-8-0).

NOTE: If only the NLG antiskid control valve has been replaced and no other rigging or adjustment has been changed, operation can be checked per 32-8-0, steps 5.B.(2) thru 5.C.(9), 5.H.(2) thru 5.H.(5), and 5.H.(7).






Nose Landing Gear Antiskid Control Valve Installation
Figure 202

## MAIN LANDING GEAR (MLG) BRAKE SHUTTLE VALVES - MAINTENANCE PRACTICES

1. Removal/Installation MLG Brake Shuttle Valves (see Figure 201)

   A. Equipment Required - None.

   B. Preparation.

      (1) Reduce hydraulic pressure to 0 psig (refer to Chapter 12, SERVICING).

      (2) Open and attach warning tag to the HYD PUMP MOTOR CONT circuit breaker, on main circuit breaker panel.

   C. Remove MLG Brake Shuttle Valve.

      WARNING: DO NOT OPERATE THE EMERGENCY BRAKE HANDLE WHILE SHUTTLE VALVE(S) IS BEING REMOVED OR INSTALLED.

      (1) Gain access to the MLG brake shuttle valve to be removed. The shuttle valves are mounted on support brackets on forward side of the MLG beam in main wheel wells.

      (2) Identify and disconnect two hydraulic lines and emergency air line from brake shuttle valve.

      (3) Remove two mounting bolts, washers, and nuts; remove shuttle valve.

         NOTE: Remove restrictor and fittings from ports in shuttle valve and hold for installation on replacement valve; discard "O" rings.

   D. Install MLG Brake Shuttle Valve.

      (1) Install restrictor (at air end of shuttle valve) and fittings in ports of replacement shuttle valve. Use new "O" rings for installation. ("O" rings must be soaked in Skydrol 500A hydraulic fluid prior to installation.)

      (2) Install shuttle valve in correct position with mounting bolts, washers, and nuts.

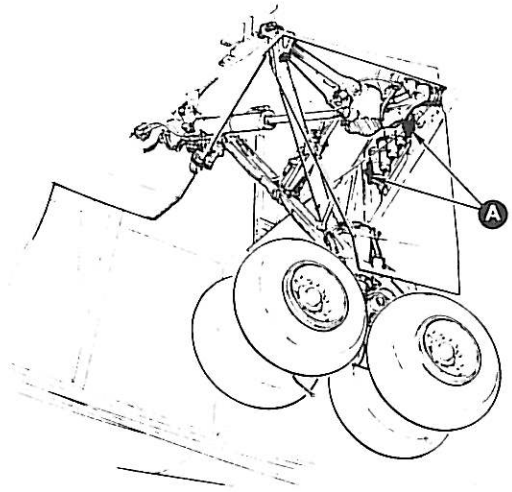
      (3) Connect hydraulic lines to shuttle valve, as identified in step C. (2).

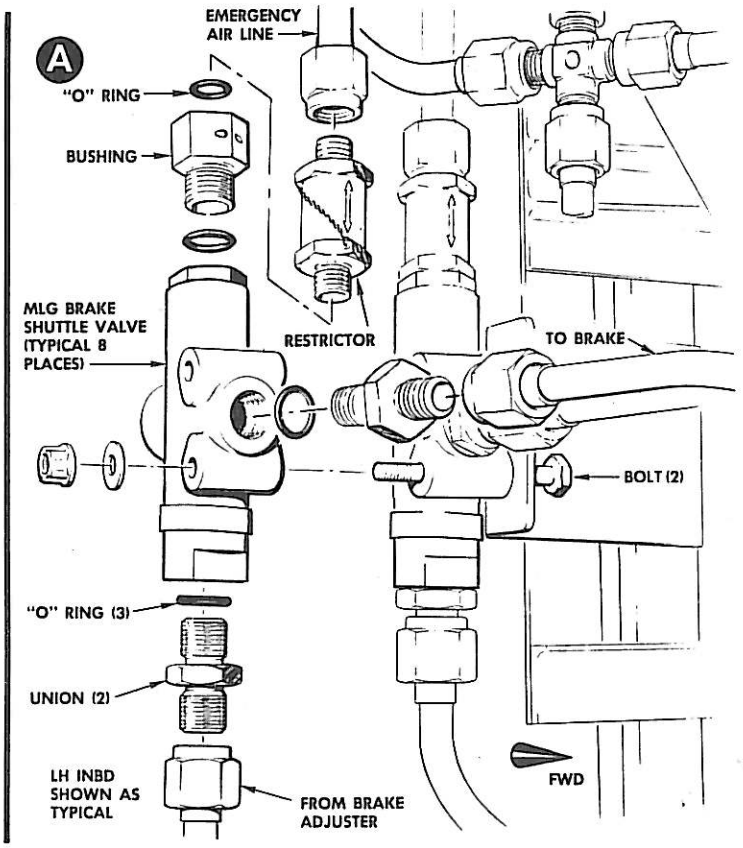
      (4) Connect emergency air line to shuttle valve.

      (5) Remove warning tag and close HYD PUMP MOTOR CONT circuit breaker.

(6) Bleed MLG brake hydraulic system (refer to 32-8-0) and check shuttle valve(s) for leaks.

NOTE: Only the brake(s) downstream of replaced shuttle valve(s) need be bled.

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Main Landing Gear Brake Shuttle Valve Installation
Figure 201

## LANDING GEAR BRAKE ADJUSTERS - MAINTENANCE PRACTICES

1. Removal/Installation MLG Brake Adjusters (see Figure 201)

   A. Equipment Required - None.

   B. Preparation.

      (1) Reduce hydraulic pressure to 0 psig (refer to Chapter 12, SERVICING).

      (2) Open and attach warning tag to the HYD PUMP MOTOR CONT circuit breaker, on main circuit breaker panel.

   C. Remove MLG Brake Adjuster.

      (1) Gain access to the MLG brake adjuster to be removed. The brake adjusters are mounted on support brackets on forward side of the MLG beam in main wheel wells.

      (2) Identify and disconnect two hydraulic lines from brake adjuster.

      (3) Loosen two clamps and remove brake adjuster.

         NOTE: Remove fittings from ports in brake adjuster and hold for installation on replacement brake adjuster; discard "O" rings.

   D. Install MLG Brake Adjuster.

      (1) Install fittings in ports of replacement brake adjuster. Use new "O" rings for installation. ("O" rings must be soaked in Skydrol 500A hydraulic fluid prior to installation.)

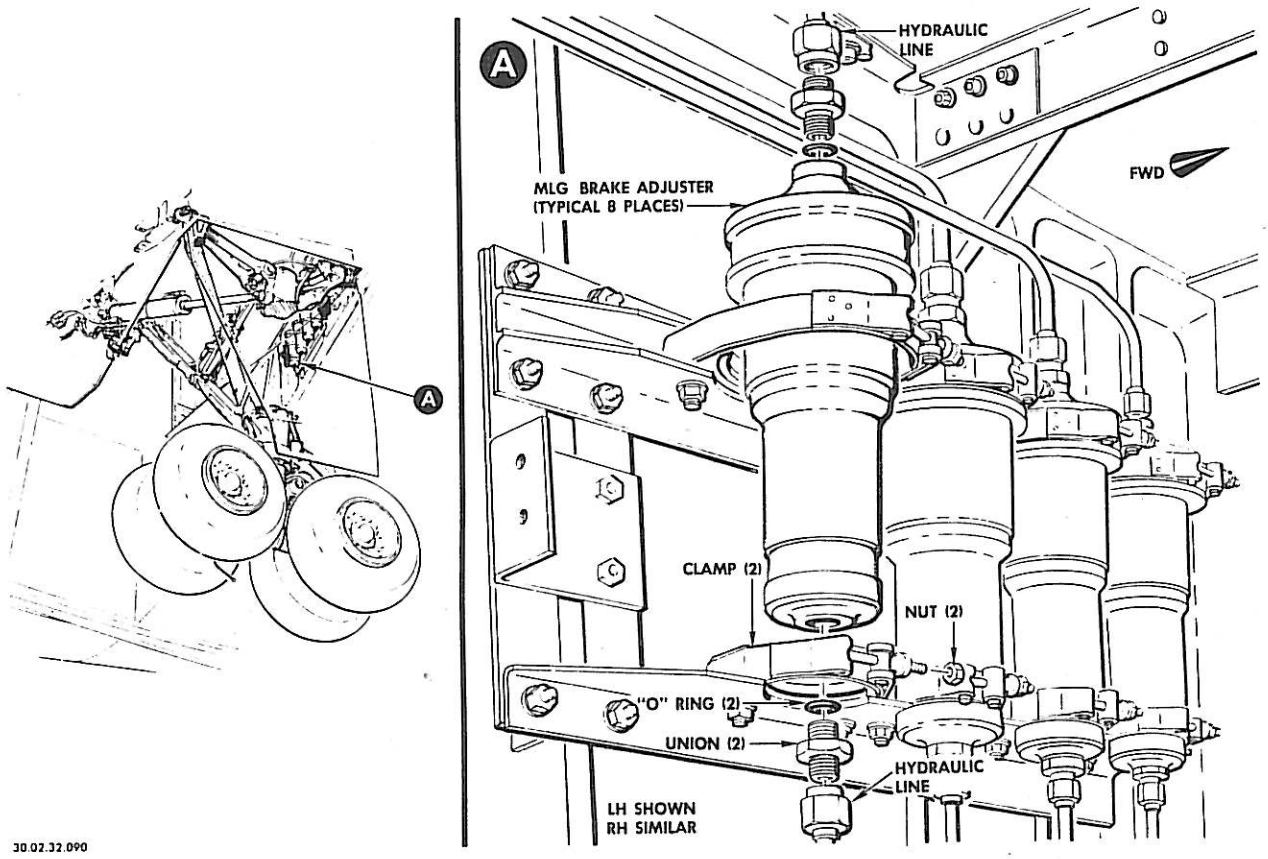
      (2) Place MLG brake adjuster in correct position on mounting bracket and secure with clamps.

      (3) Connect hydraulic lines to brake adjuster, as identified in step C.(2).

      (4) Remove warning tag and close HYD PUMP MOTOR CONT circuit breaker.

      (5) Bleed MLG brake hydraulic system (refer to 32-8-0) and check brake adjuster for leaks.

         NOTE: Only the brake(s) downstream of replaced brake adjuster(s) need be bled.






Main Landing Gear Brake Adjuster Installation
Figure 201

2. Removal/Installation NLG Brake Adjuster (see Figure 202)

A. Equipment Required - None.

B. Preparation.

(1) Reduce hydraulic pressure to 0 psig (refer to Chapter 12, SERVICING).

(2) Open and attach warning tag to the HYD PUMP MOTOR CONT circuit breaker, on main circuit breaker panel.

C. Remove NLG Brake Adjuster.

(1) Gain access to the NLG brake adjuster in the nose wheel well, right side.

(2) Identify and disconnect two hydraulic lines from brake adjuster.

(3) Loosen clamps and remove brake adjuster.

NOTE: Remove fittings from ports in brake adjuster and hold for installation on replacement brake adjuster; discard "O" rings.

D. Install NLG Brake Adjuster.

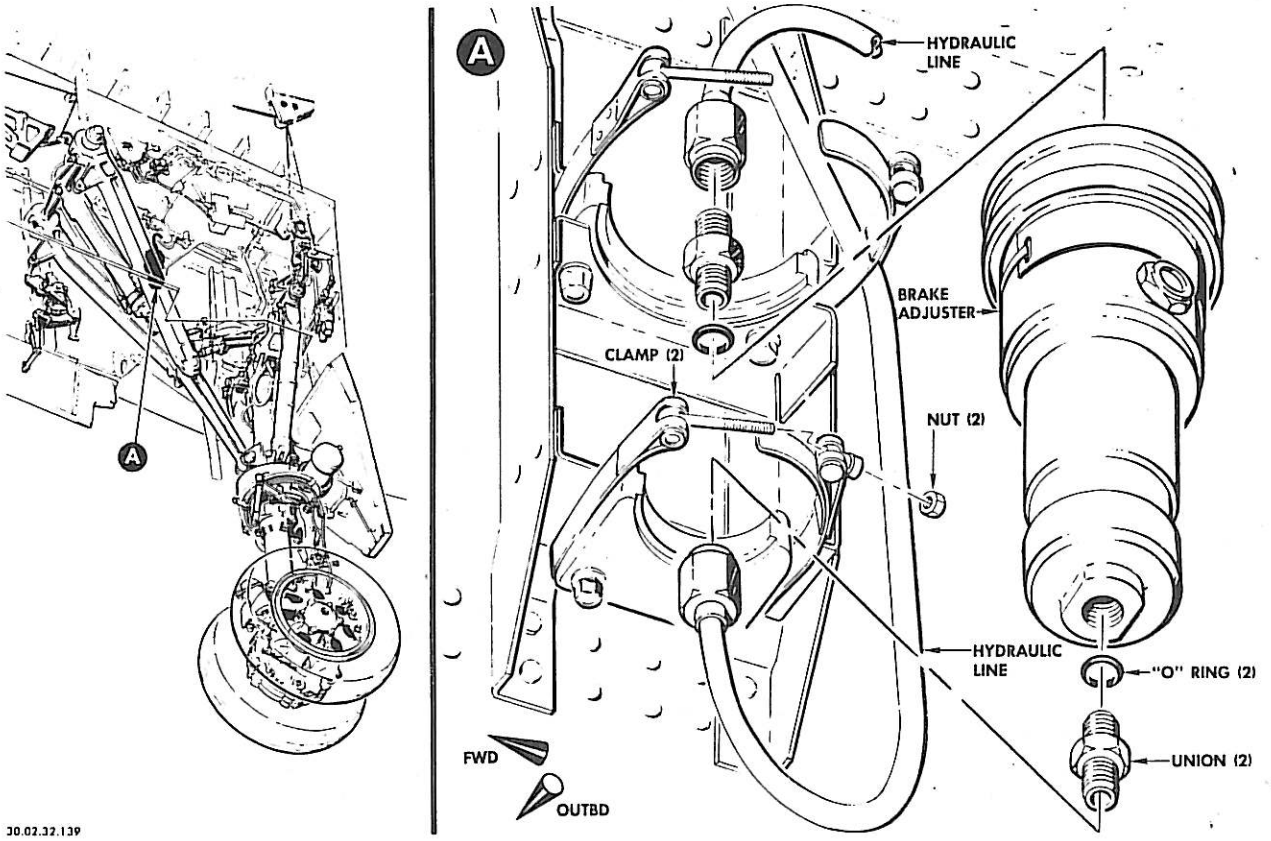
(1) Install fittings in ports of replacement brake adjuster. Use new "O" rings for installation. ("O" rings must be soaked in Skydrol 500A hydraulic fluid prior to installation.)

(2) Place NLG brake adjuster in correct position on mounting bracket and secure with clamps.

(3) Connect hydraulic lines to brake adjuster, as identified in step C.(2).

(4) Remove warning tag and close HYD PUMP MOTOR CONT circuit breaker.

(5) Bleed NLG brake hydraulic system (refer to 32-8-0) and check brake adjuster for leaks.






Nose Landing Gear Brake Adjuster Installation
Figure 202

## LANDING GEAR BRAKE ASSEMBLIES - MAINTENANCE PRACTICES

1. Removal/Installation NLG Brake Assemblies (see Figure 201)

A. Equipment Required.

(1) Hydraulic Jack.

(2) Wedge assembly (Hydro-Aire 40-433156) for disengaging the NLG skid detector.

B. Materials Required. Antiseize compound, Specification MIL-T-5544 to lubricate brake mounting bolts.

C. Preparation.

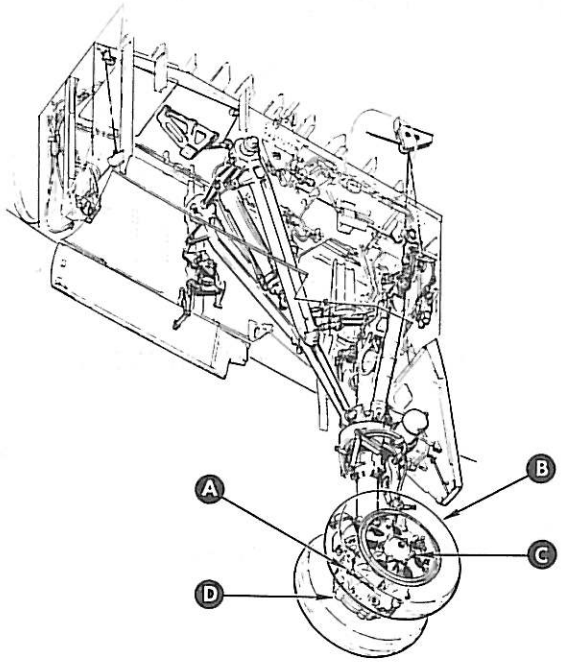
| | Figure Detail |
|---|---|
| (1) Install wedge assembly (fork) on NLG skid detector disengage pin to release NLG skid detector drive. | A |
| (2) Check that ground safety pins are installed in all gear. | |
| (3) Reduce hydraulic pressure to 0 psig (refer to Chapter 12, SERVICING). | |
| (4) Jack nose gear until NLG wheels clear the ground. Use hydraulic jack at nose gear jack pad (refer to Chapter 7, LIFTING AND SHORING). | |

D. Remove NLG Brake Assembly.

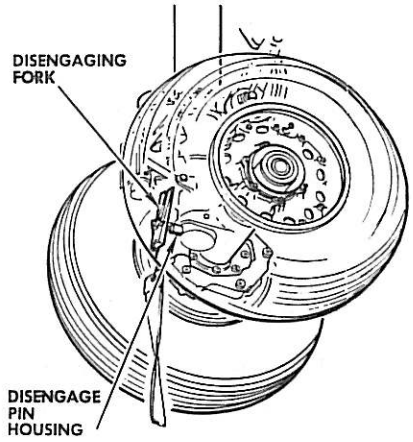
| | |
|---|---|
| (1) Remove nose wheel (refer to 32-3-5). | B,C |
| (2) Remove bearing spacer from NLG outer axle | B,C |
| (3) Disconnect brake hydraulic line at quick disconnect on pressure manifold between NLG brakes. Remove two hydraulic lines between pressure manifold and NLG brakes. (Cap open lines and ports.) | D |
| (4) Remove nuts securing pressure manifold support bracket to brakes; remove manifold and bracket. | D |
| (5) Remove ten bolts and washers securing brake assembly to NLG brake mounting flange; remove brake. | D |

E. Install NLG Brake Assembly.

| | |
|---|---|
| (1) Place brake assembly on axle and install ten mounting bolts as follows: | D |
| (a) Lubricate bolt threads and washers with antiseize compound, Specification MIL-T-5544. | |

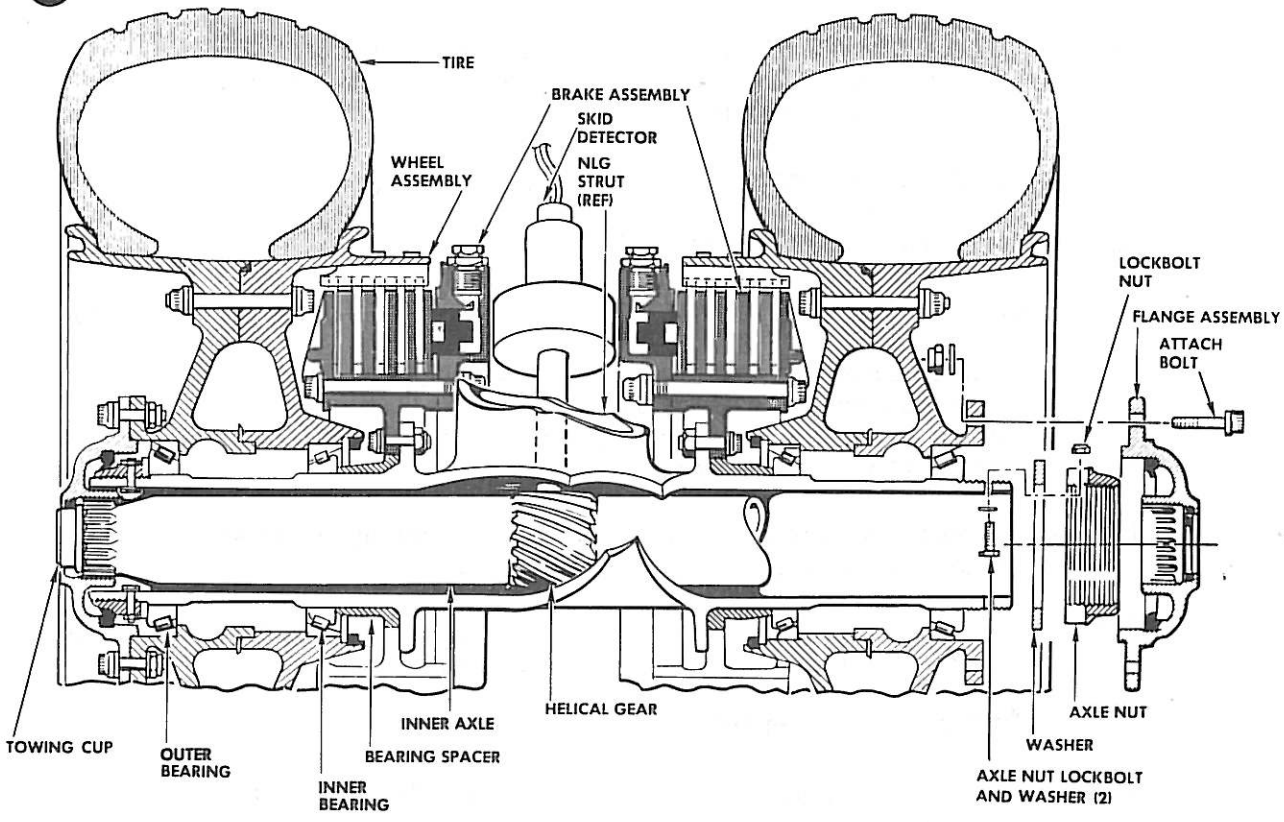



A




SKID DETECTOR DRIVE DISENGAGEMENT

B




CROSS SECTION—AXLE AND WHEEL ASSEMBLY

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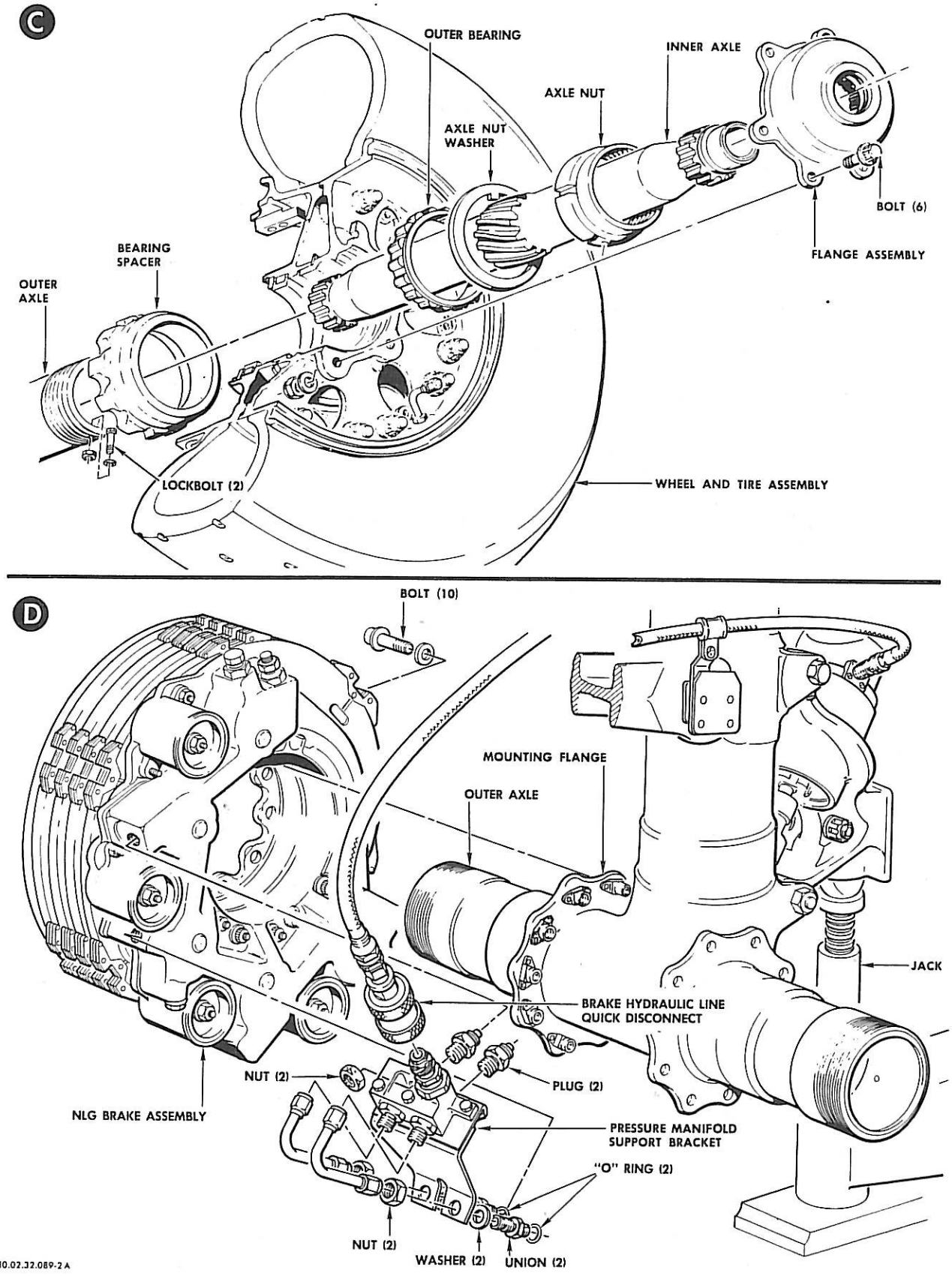

C
OUTER BEARING
INNER AXLE
AXLE NUT
AXLE NUT WASHER
BOLT (6)
FLANGE ASSEMBLY
BEARING SPACER
OUTER AXLE
LOCKBOLT (2)
WHEEL AND TIRE ASSEMBLY
D
BOLT (10)
MOUNTING FLANGE
OUTER AXLE
JACK
BRAKE HYDRAULIC LINE QUICK DISCONNECT
NUT (2)
PLUG (2)
NLG BRAKE ASSEMBLY
PRESSURE MANIFOLD SUPPORT BRACKET
"O" RING (2)
NUT (2)
WASHER (2)
UNION (2)
30.02.32.089-2 A

| | Figure Detail |
|---|---|
| (b) Align brake assembly with holes in mounting flange and install bolts and washers. Tighten bolts 325 to 375 inch-pounds Lubtork. | |
| (2) Install pressure manifold and support bracket between NLG brakes. Safety-wire support bracket hardware. | D |
| (3) Install hydraulic pressure lines between pressure manifold and brakes. Connect brake flexible line at quick disconnect on pressure manifold. | D |
| (4) Install bearing spacer on NLG outer axle. | B,C |
| (5) Install nose wheel (refer to 32-3-5). | B,C |
| (6) Lower wheels to ground and remove jack (refer to Chapter 7, LIFTING AND SHORING). | |
| (7) Remove fork from NLG skid detector disengage pin and engage skid detector drive. | A |
| (8) Bleed NLG brake hydraulic system (refer to 32-8-0). | |

2. Removal/Installation MLG Brake Assemblies

A. Equipment Required.

(1) Wheel change support dolly.

(2) Hydraulic jack.

B. Remove MLG Brake Assembly (see Figure 202).

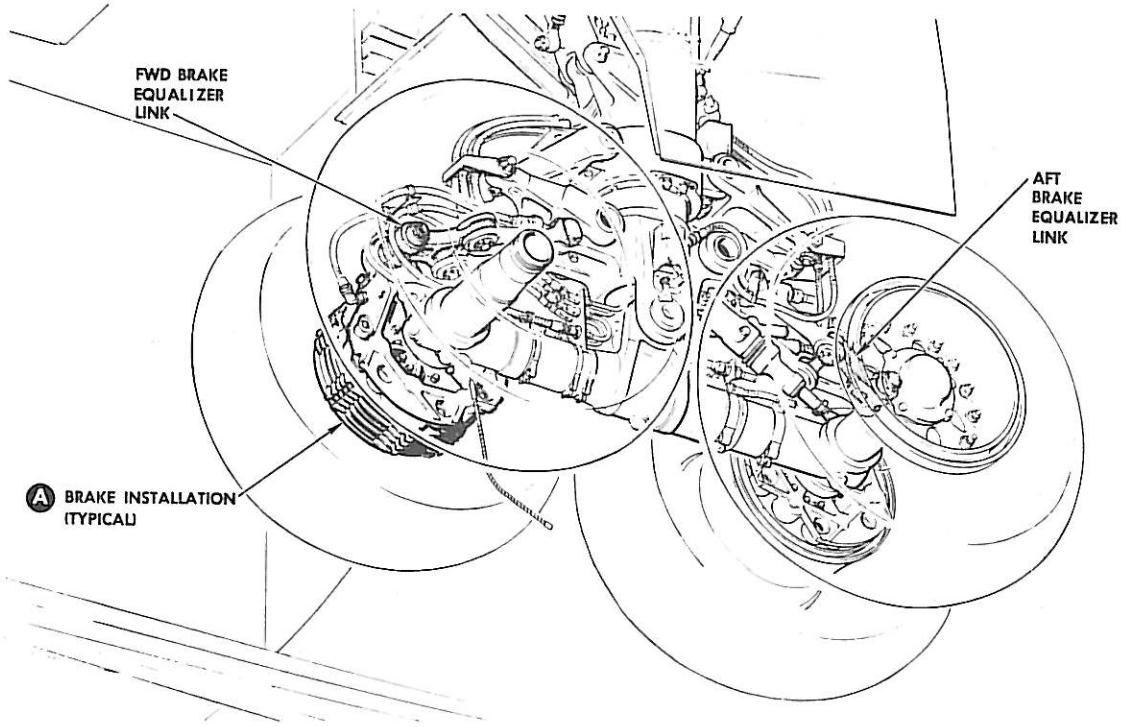
(1) Jack truck assembly at forward or aft jacking point until wheel to be removed is clear of ground (refer to Chapter 7, LIFTING and SHORING).

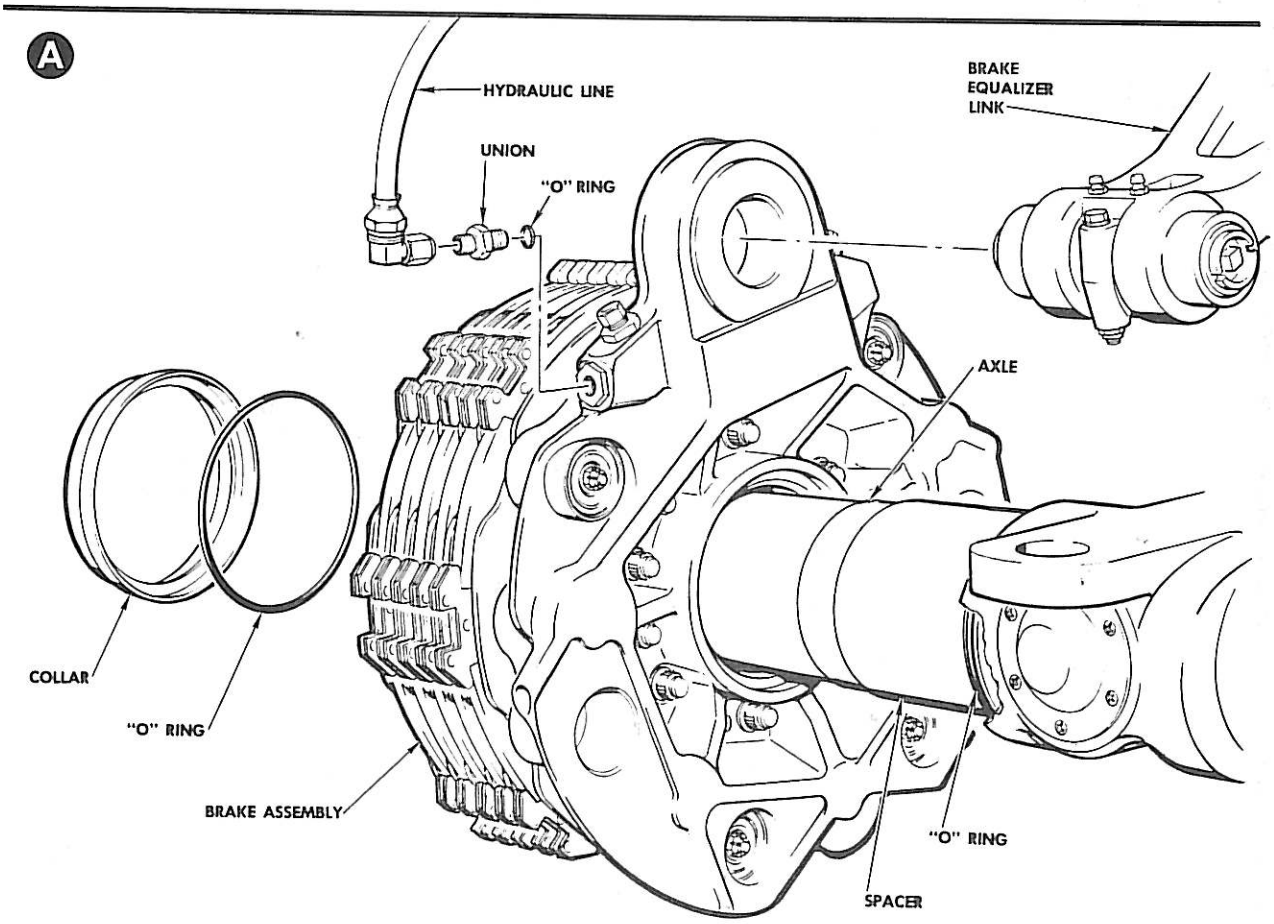
(2) Remove wheel (refer to 32-1-6).

(3) Remove collar from axle.

(4) Disconnect hydraulic line at brake. (Cap open line and port).

(5) Remove brake assembly from equalizer link and axle.


FWD BRAKE EQUALIZER LINK
AFT BRAKE EQUALIZER LINK
A BRAKE INSTALLATION (TYPICAL)


A
HYDRAULIC LINE
UNION
"O" RING
BRAKE EQUALIZER LINK
AXLE
COLLAR
"O" RING
BRAKE ASSEMBLY
"O" RING
SPACER

30.02.32.088

C. Install MLG Brake Assembly (see Figure 202).

NOTE: Prior to accomplishing step (1) following check that "O" ring seal is installed in groove of spacer on MLG axle.

(1) Install brake assembly on equalizer link and axle.

(2) Connect hydraulic line to brake.

(3) Install "O" ring seal on outer bushing of brake assembly.

(4) Install collar on axle.

(5) Install wheel (refer to 32-1-6).

(6) Lower wheels to ground and remove jack (refer to Chapter 7, LIFTING AND SHORING).

(7) Bleed MLG brake hydraulic system (refer to 32-8-0).

NOTE: Only the brake(s) being installed need be bled.

3. Adjustment/Test NLG and MLG Brake Assemblies - Running Clearances and Allowable Wear (see Figure 203)

NOTE: The brake lining allowable wear limits are duplicated on placards cemented to the carrier assembly of each brake.

A. Equipment Required - None.

B. Preparation.

(1) Pressurize airplane hydraulic systems (refer to Chapter 29, HYDRAULIC POWER).

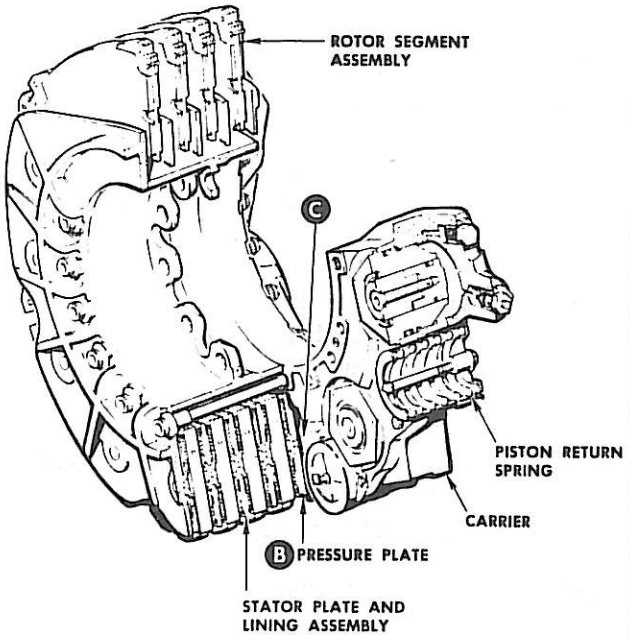
NOTE: When checking NLG brake wear, the 28-volt dc essential bus must be energized, ANTI-SKID NOSE POWER circuit breaker closed, ANTI-SKID control switch turned to ON, nose wheel brakes control switch turned on, and brake pedals depressed against stops.

(2) Depress and release brake pedals several times.

C. Check Procedure.

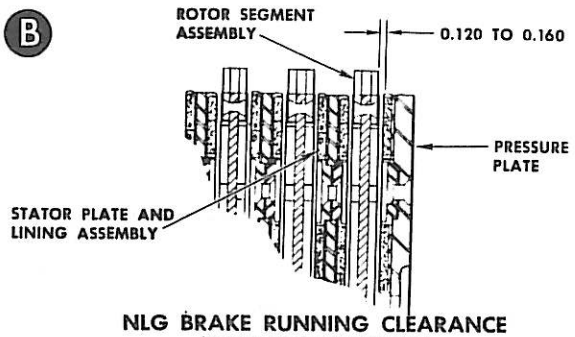
| | Figure Detail |
|---|---|
| (1) With brake pedals released, measure running clearance between brake friction surfaces. | |
| (a) NLG brakes shall have 0.120 to 0.160 inch clearance. | A,B |

A



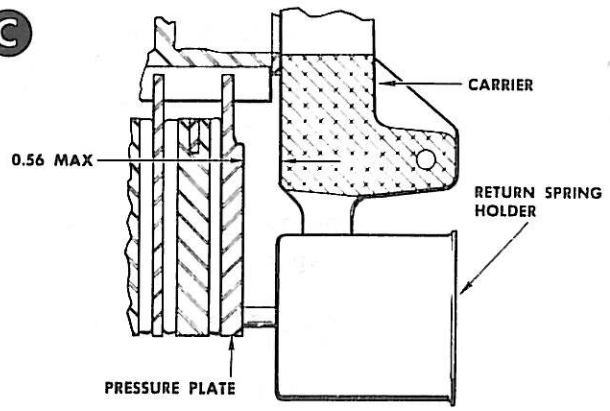

NLG BRAKE ASSEMBLY

B



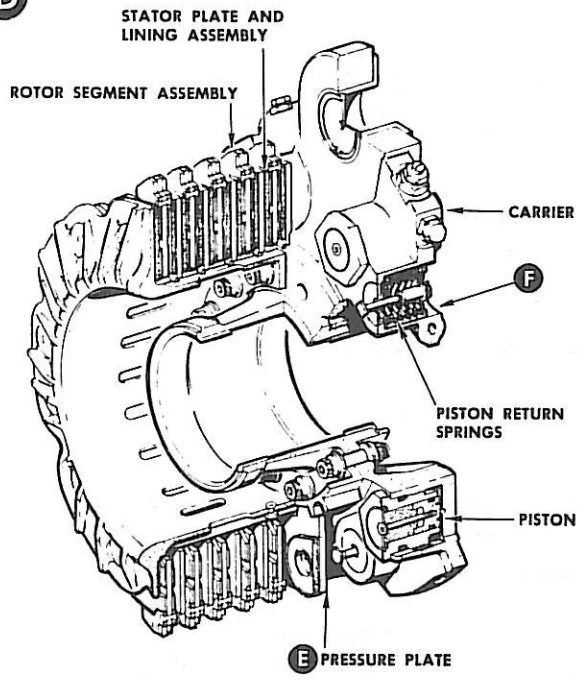

NLG BRAKE RUNNING CLEARANCE
(BRAKE PRESSURE RELEASED)

C



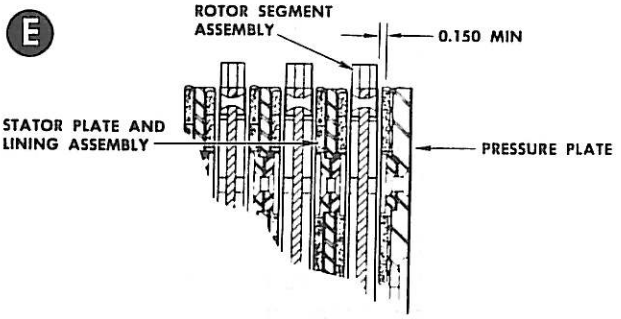

NLG BRAKE LINING ALLOWABLE WEAR
(BRAKE PRESSURE APPLIED)

D



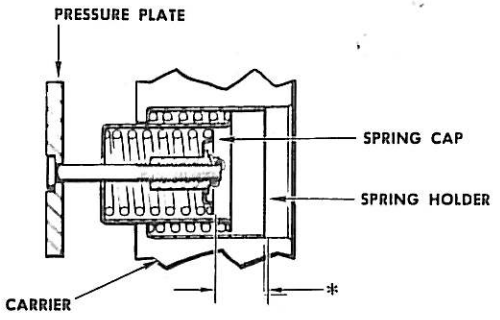

MLG BRAKE ASSEMBLY

E




MLG BRAKE RUNNING CLEARANCE
(BRAKE PRESSURE RELEASED)

F




* 0.77 MAX BEFORE BENDIX S/B NO. 1113
1.28 MAX AFTER BENDIX S/B NO. 1113

MLG BRAKE LINING ALLOWABLE WEAR
(BRAKE PRESSURE APPLIED)

30.02.32.147 A

Brake Assembly Clearances and Allowable Wear
Figure 203

| | Figure Detail |
|---|---|
| (b) MLG brakes shall have 0.150-inch minimum clearance. | D,E |
| (2) Depress brake pedals against stops and check brake assemblies for lining wear beyond permissible limits. | |
| (a) Replace NLG brake if 0.56-inch feeler gage can be inserted at any place around the carrier, between carrier and pressure plate. | A,C |
| (b) For MLG brakes not incorporating Bendix Service Bulletin No. 1113, replace brake if any spring cap has receded 0.77 inch or more into its holder. | D,F |
| (c) For MLG brakes incorporating Bendix Service Bulletin No. 1113, replace brake if any spring cap has receded 1.28 inch or more into its holder. | D,F |

4. Inspection/Check NLG and MLG Brake Assemblies - Visual Check

A. Equipment Required - None.

B. Visually check the following:

(1) Hydraulic leaks at line connections and around the brake pistons.

(2) Brake running clearances and allowable wear (refer to Adjustment/Test NLG and MLG Brake Assemblies - Running Clearances and Allowable wear).

(3) Loose linings and excessively worn surfaces. A lining is considered loose when a 0.015-inch feeler gage can be inserted under the button 1/2 inch or more.

(4) Rotor segment assemblies for loose, cracked, or broken parts.

(5) Brake pressure plate for tendency to hang or stick upon release of brake pressure.

(6) All brake parts for general condition, finish, and evidence of corrosion. If any parts show evidence of excessive corrosion, brake should be replaced.

(7) Paint for chips, scratches, and general condition. Touch up paint in accordance with Chapter 51, STRUCTURES-GENERAL.

## LANDING GEAR BRAKE ANTISKID SYSTEM CONTROL BOX - MAINTENANCE PRACTICES

1. Removal/Installation Antiskid System Control Box (see Figure 201)

   A. Equipment Required - None.

   B. Preparation. Open and attach warning tags to the following circuit breakers, on main circuit breaker panel:

      ANTI-SKID MAIN POWER, NOSE POWER, CONT. and WARN.

   C. Remove Antiskid System Control Box.

      (1) Gain access to the antiskid system control box in right-hand main wheel well.

      (2) Disconnect six electrical harnesses from the control box.

      (3) Remove four mounting screws and remove control box from support brackets.

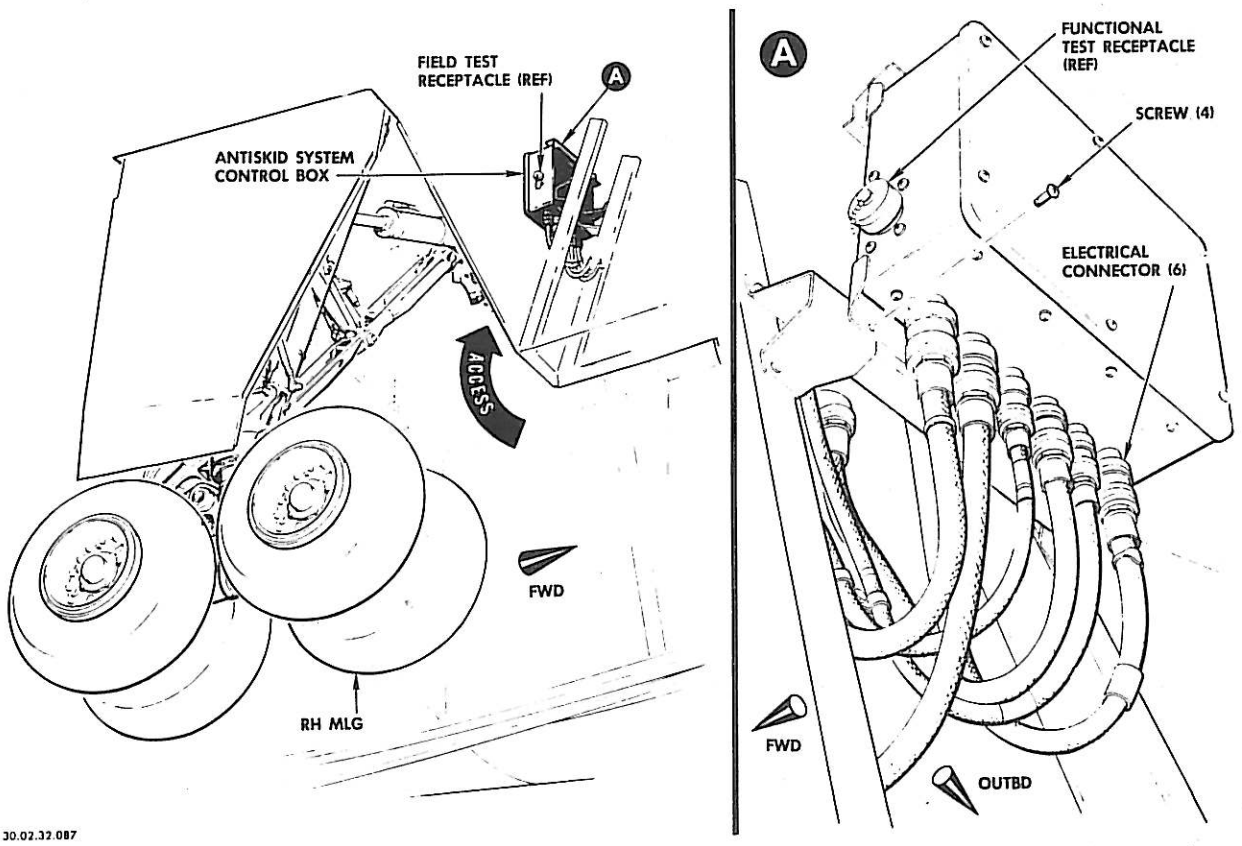
   D. Install Antiskid System Control Box.

      (1) Mount control box in correct position on support brackets and secure with mounting screws.

      (2) Connect six electrical harnesses to control box.

      (3) Remove warning tags and close circuit breakers opened in step B.

      (4) Perform Adjustment/Test Antiskid System - Functional Check (refer to 32-8-0).






Antiskid System Control Box Installation
Figure 201

## LANDING GEAR WHEEL SKID DETECTORS - MAINTENANCE PRACTICES

1. Removal/Installation MLG Skid Detectors (see Figure 201)

   A. Equipment Required - None.

   B. Preparation. Open and attach warning tags to the ANTI-SKID MAIN POWER, CONT, and WARN circuit breakers, on main circuit breaker panel.

   C. Remove MLG Skid Detector.

      (1) Remove bolts, washers, and nuts that secure hub cap to wheel. Remove hub cap.

      (2) Remove two lockbolts that lock axle nut to axle.

      (3) Pull skid detector from axle and disconnect electrical harness.

   D. Install MLG Skid Detector.

      (1) Connect electrical harness to skid detector.

      (2) Insert skid detector in axle.

      (3) Install axle nut lockbolts.

      (4) Remove warning tags and close ANTI-SKID MAIN POWER, CONT, and WARN circuit breakers.

      (5) Perform Adjustment/Test Antiskid System - Functional Check (refer to 32-8-0).

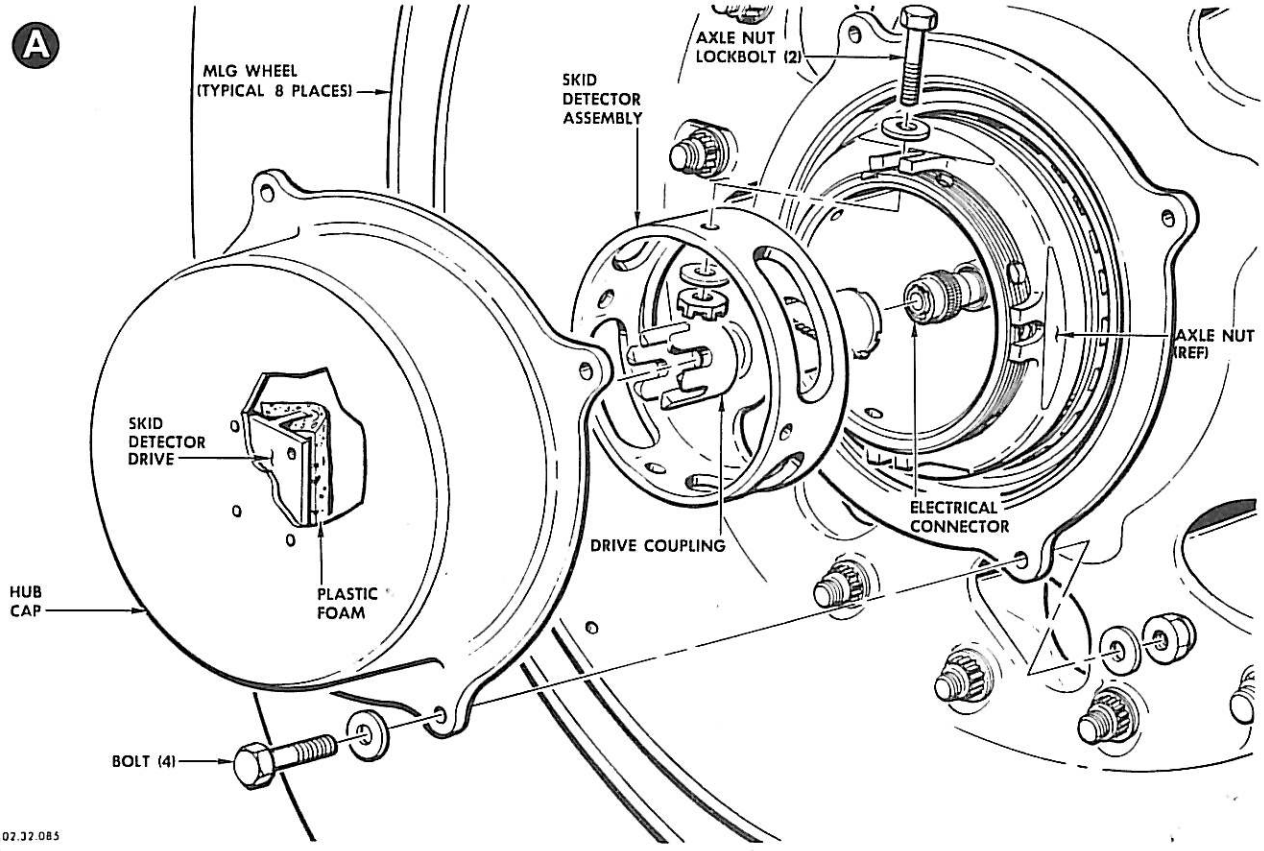
         NOTE: If only a MLG skid detector has been replaced and no other rigging or adjustment has been changed, operation can be checked per 32-8-0, steps 5.B.(3) thru 5.B.(7), 5.B.(11), 5.D.(1) thru 5.D.(3)(b) (applicable MLG wheel only), and 5.H.(2) thru 5.H.(4).

      (6) Install hub cap and secure with bolts, washers, and nuts.

2. Removal/Installation NLG Skid Detector (see Figure 202)

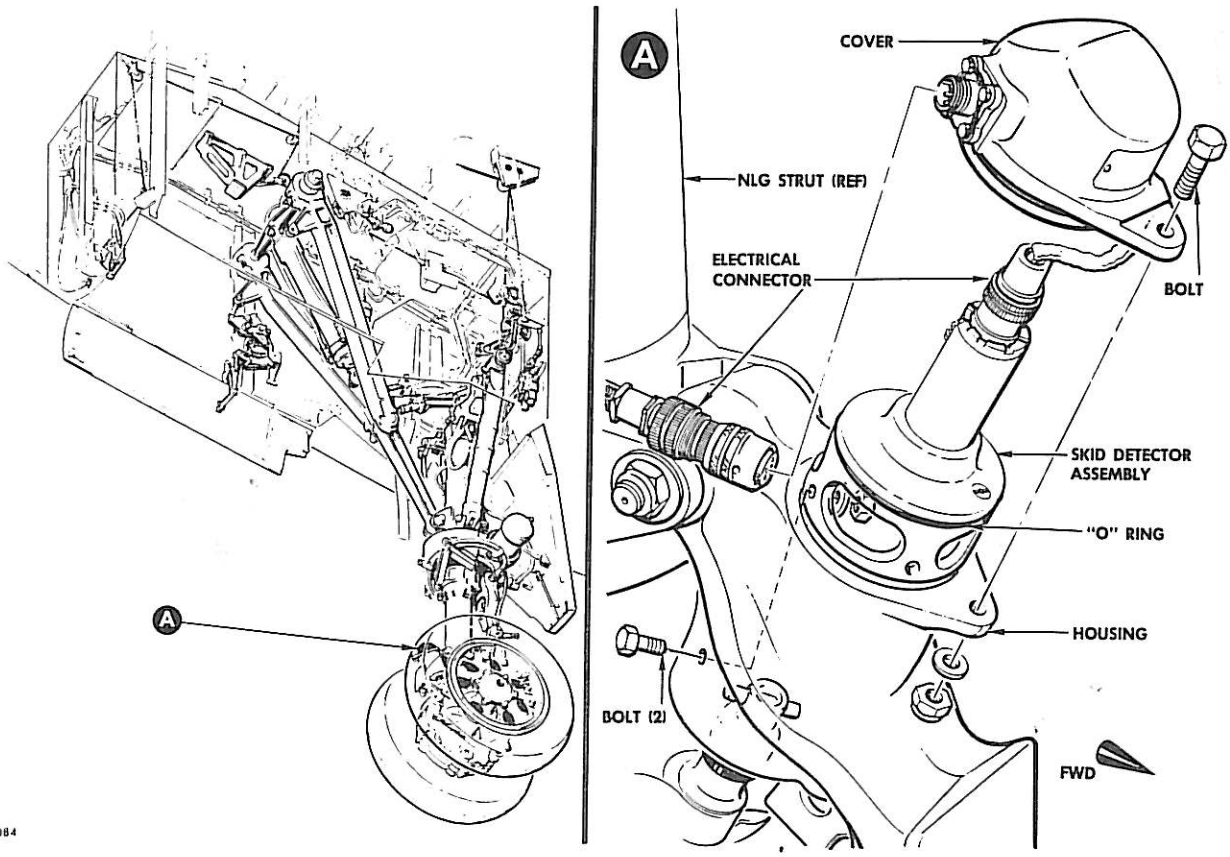
   A. Equipment Required - None.

   B. Preparation. Open and attach warning tags to the ANTI-SKID NOSE POWER and WARN circuit breakers, on main circuit breaker panel.






Main Landing Gear Skid Detector Installation
Figure 201


A
COVER
NLG STRUT (REF)
ELECTRICAL CONNECTOR
BOLT
SKID DETECTOR ASSEMBLY
"O" RING
HOUSING
BOLT (2)
FWD
A
30.02.32.084

C. Remove NLG Skid Detector.

(1) Disconnect electrical harness from skid detector housing cover.

(2) Remove bolt, washer, and nut attaching housing cover to detector housing; remove cover.

(3) Disconnect electrical connector from skid detector.

(4) Remove two bolts, washers, and nuts that secure skid detector to detector housing.

(5) Remove skid detector from housing.

D. Install NLG Skid Detector.

(1) Check operation of replacement NLG skid detector (refer to 32-8-0, Adjustment/Test Antiskid System - Functional Check).

NOTE: If only the NLG skid detector is being replaced and no other rigging or adjustment has been changed, operation can be checked per 32-8-0, steps 5.B.(3) thru 5.C.(9) and 5.H.(2) thru 5.H.(4).

(2) Install new "O" ring on adapter and insert skid detector into detector housing. Align skid detector drive with drive shaft coupling.

(3) Install bolts, washers, and nuts securing skid detector to detector housing.

(4) Connect electrical connector to skid detector.

(5) Place new "O" ring on housing cover flange and install cover on detector housing. Install bolt, washer, and nut, and safety-wire.

(6) Connect electrical harness to detector housing cover.

## BRAKE PEDALS AND LINKAGE - MAINTENANCE PRACTICES

1. Removal/Installation Brake Pedals and Linkage (see Figure 201)

A. Scope of Work Involved.

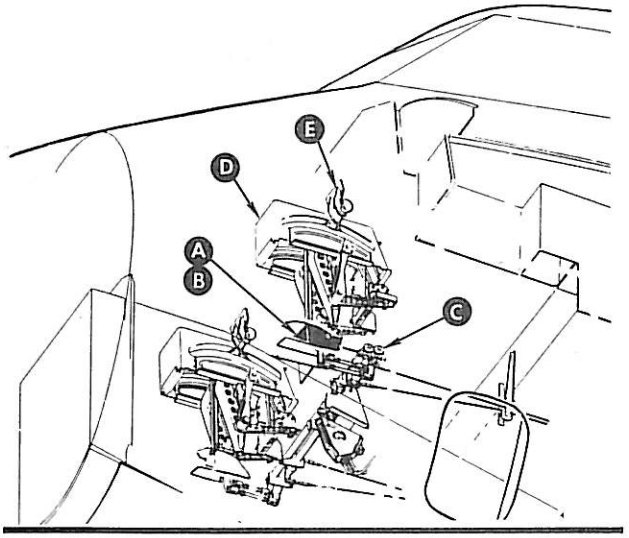
This procedure is for the removal and installation of the brake pedals, control rods, bell cranks, and push rods. The brake pedal feel mechanism on *Group II airplanes is also included. It does not include removal and installation of the torque transfer tubes or other components of the brake system.

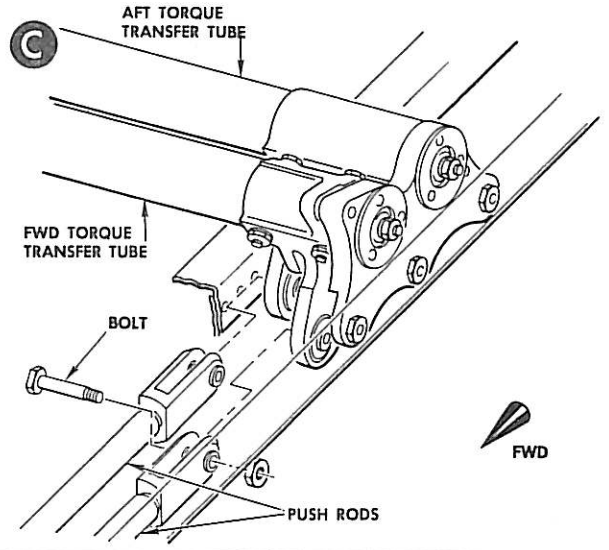
B. Equipment Required - None.

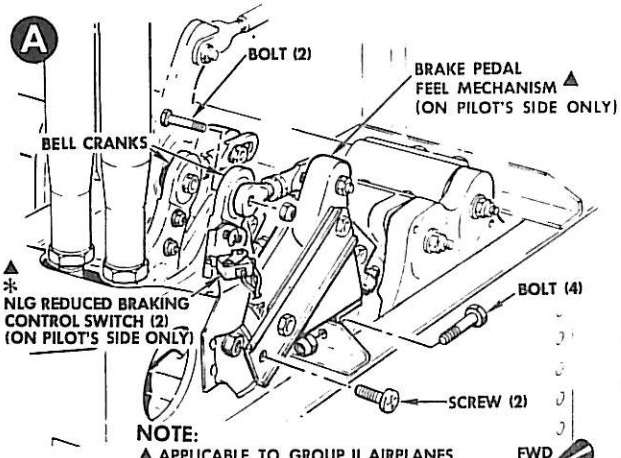
C. Remove Brake Pedals and Linkage.

| | Figure Detail |
|---|---|
| (1) Gain access to the control rods, lower bell cranks, and push rods through the electrical "tunnel" compartment doors. | |
| (2) *For Group II airplanes, if removing the pilot's brake pedals and linkage, remove brake pedal feel mechanism as follows: | |
| (a) Remove NLG reduced braking control switches (refer to 32-8-12). (Applicable to *Group II airplanes CV5 thru CV24 only.) | A,B |
| (b) Remove two bolts and nuts connecting slotted links of the feel mechanism to the lower bell crank assemblies. | A |
| (c) Remove two screws and nuts attaching the feel mechanism to the lower bell crank housing. | A |
| (d) Remove four bolts and nuts securing the feel mechanism to support angle; remove feel mechanism. | A |
| (3) Disconnect control rods from the lower bell crank assemblies. | B |
| (4) Disconnect the forward ends of the push rods from the bell crank assemblies. | B |
| (5) Remove nut and pivot bolt connecting bell crank assemblies to support bracket. Remove bell crank assemblies. | B |
| (6) Disconnect push rods from arms at forward and aft torque transfer tubes; remove push rods. | C |
| (7) Disconnect the lower joint of the rudder pedal adjustment torque shaft by drilling out connecting rivet. | D |
| (8) Gain access to the brake pedals, pedal housing, upper control rods, and bell cranks in the flight compartment. | |

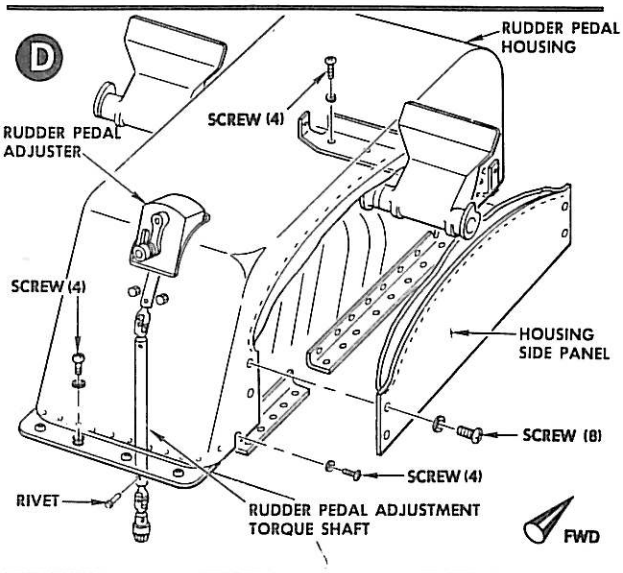
*Refer to Manual INTRODUCTION for Explanation of Group Designations.



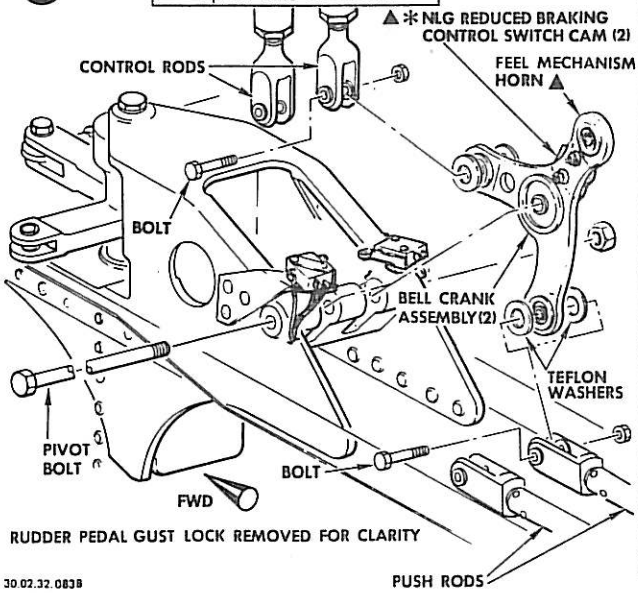



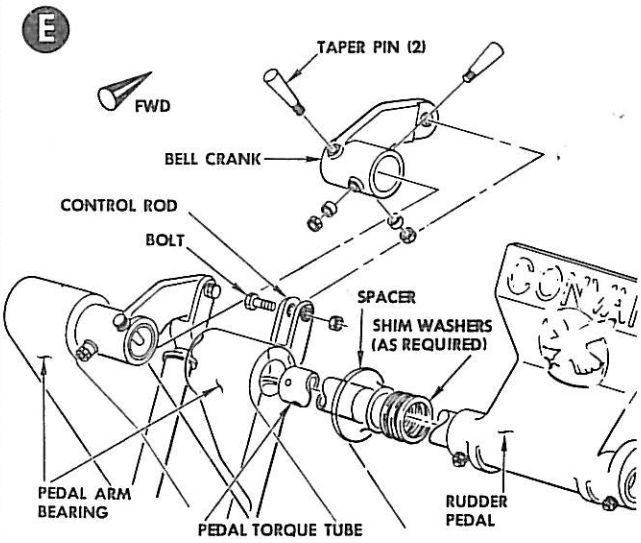




NOTE:
▲ APPLICABLE TO GROUP II AIRPLANES. REFER TO MANUAL INTRODUCTION FOR EXPLANATION OF GROUP DESIGNATIONS.




| EFFECTIVITY |
| --- |
| APPLICABLE TO AIRPLANES |
| * CV5 THRU CV24 ONLY |

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| | Figure Detail |
|---|---|
| (9) Remove rudder pedal housing side panels and remove mounting screws from housing. Remove housing (with rudder pedal adjuster). | D |
| (10) Disconnect control rods from pedal bell cranks. | E |
| (11) Remove two taper pins from bell crank and slide bell crank from pedal torque tube. | E |
| (12) Remove pedal and torque tube with spacer, and shim washers, from rudder pedal arm bearing. | E |

D. Install Brake Pedals and Linkage.

| | |
|---|---|
| (1) Slide pedal and torque tube, with spacer and shim washers, into rudder pedal arm bearing. Slide bell crank on pedal torque tube and line up holes in bell crank assembly with holes in torque tube. Install taper pins, washers, and nuts. | E |
| NOTE: Add shim washers, as necessary, between spacer and pedal on torque tube, to remove all side play. | |
| (2) Connect control rods to pedal bell cranks. | E |
| (3) Install rudder pedal housing (with rudder pedal adjusting crank) and install housing side panels. | D |
| (4) Center rudder pedal position indicator by rotating adjusting crank. Crank should be straight down when indicator is centered. Connect lower pedal adjusting torque tube and install AN470DD4 rivet. | D |
| NOTE: Refer to Chapter 27, FLIGHT CONTROL for rigging the rudder pedal adjuster. | |
| (5) Position lower bell crank assemblies in support bracket and install pivot bolt and nut. | B |
| (6) Connect control rods and push rods to bell crank assemblies. | |
| (7) Connect push rods to the arms at forward and aft torque transfer tubes. | C |

Figure
Detail

(8) *For Group II airplanes, if installing the pilot's brake pedals and linkage, install brake pedal feel mechanism as follows:

(a) Place the brake pedal feel mechanism in position aft of the lower bell crank housing and align bolt holes in the bell crank housing, feel mechanism, and support angle. — A

(b) Install four bolts and nuts securing feel mechanism to the support angle. — A

(c) Install two screws and nuts securing feel mechanism to the lower bell crank housing. — A

(d) Install two bolts and nuts attaching the feel mechanism slotted links to the lower bell crank assemblies. — A

(e) Install NLG reduced braking control switches (refer to 32-8-12). (Applicable to *Group II airplanes CV5 thru CV24 only.) — A,B

(9) Perform Adjustment/Test Normal Brake Controls - Rigging and Adjustment (refer to 32-8-0).

NOTE: If brake pedals and connecting linkage only have been replaced and no other rigging or adjustment has been changed, adjustment can be accomplished per 32-8-0, steps 1.B.(7) thru 1.B.(11), 1.C.(1), 1.C.(3), and 1.C.(9) thru 1.C.(12)(d). Operation can be checked per 32-8-0, steps 4.B.(3), 4.B.(9) thru 4.B.(15), 4.C.(3) thru 4.C.(8), 4.D.(1), 4.D.(2), 4.D.(5), and 4.D.(7).

*Refer to Manual INTRODUCTION for Explanation of Group Designations.

## PARKING BRAKE CONTROLS - TROUBLE SHOOTING

| POSSIBLE CAUSE | ISOLATION PROCEDURE AND CORRECTION |
|---|---|
| **1. PARKING BRAKE HANDLE REQUIRES EXCESSIVE FORCE TO OPERATE** | |
| A. Friction in Teleflex control cable. | Disconnect Teleflex cable at latch lever and check for smoothness of operation. Remove and replace assembly if operation is not smooth and free. |
| B. Latch lever malfunctioning. | Disconnect Teleflex cable and return spring at latch lever. Check latch for free movement. Check condition of latch lever and repair or replace as required. |
| **2. PARKING BRAKES REMAIN ENGAGED** | |
| A. Latch lever return spring malfunctioning. | Visually inspect latch lever return spring and replace or repair as necessary. |
| **3. PARKING BRAKES ENGAGED BUT AIRPLANE CREEPS** | |
| A. Leakage at brake system components or in brake lines. | Check all brake components for evidence of external leakage. Repair or replace any defective unit. Check for leakage in the brake hydraulic lines. Repair or replace as necessary. |

PARKING BRAKE CONTROLS - MAINTENANCE PRACTICES

1. Removal/Installation Parking Brake Control (see Figure 201)

Figure Detail

A. Equipment Required - None.

B. Remove Parking Brake Control.

(1) Gain access to the lower portion of the parking brake control through the left electrical "tunnel" compartment access door. Disconnect clevis from latch lever by removing cotter pin, washer, and clevis pin. — B

(2) Loosen lockbolt on clevis rod and remove clevis rod from Teleflex cable. — B

(3) Remove parking brake T-handle on pilot's auxiliary panel by removing bolt that connects T-handle to handle control. — A

(4) Gain access to parking brake handle control behind pilot's auxiliary panel. Cut safety wire and disconnect handle control from conduit and upper support bracket; remove handle control and Teleflex cable.

(5) Cut safety wire and disconnect conduit coupling from swivel assembly. — B

(6) Remove nuts and washers securing swivel assembly to the lower support bracket; remove swivel assembly. — B

(7) Cut safety wire and disconnect conduit coupling below flight compartment floor. Remove two clips that secure conduit to support angles.

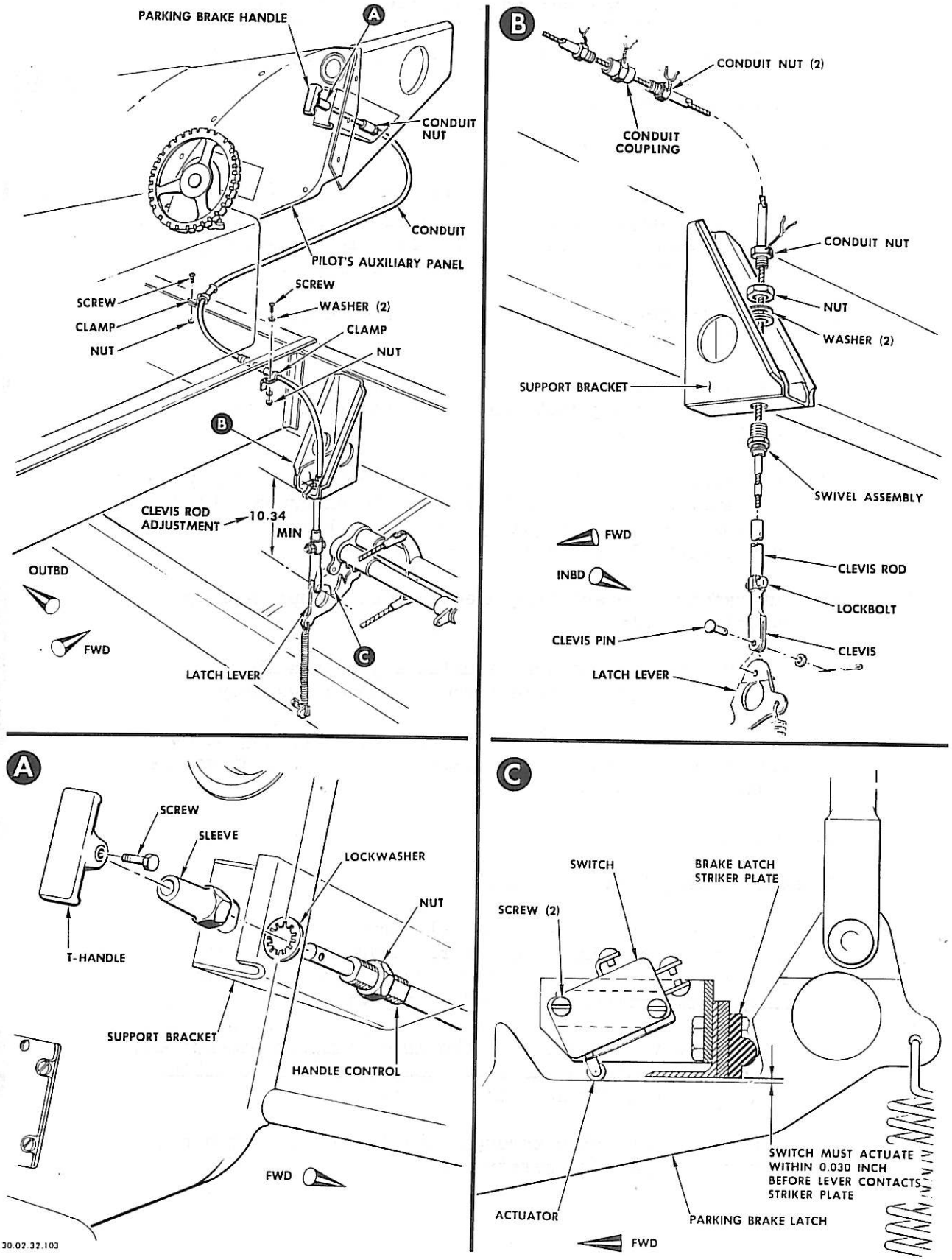
(8) Remove conduit.

C. Install Parking Brake Control.

(1) Gain access through the left electrical "tunnel" compartment access door and secure conduit in correct position with clips. Connect conduit coupling below flight compartment floor and safety-wire.

(2) Install swivel assembly in the lower support bracket and secure with washers and nut. Connect conduit coupling to swivel assembly and safety-wire. — B

(3) Route Teleflex cable through conduit and connect handle control to conduit; safety-wire.




Parking Brake Control Assembly
and Switch Installation
Figure 201

| | Figure Detail |
|---|---|
| (4) Connect T-handle to control on pilot's auxiliary panel. | A |
| (5) Connect clevis rod to Teleflex cable. | B |
| (6) With T-handle pushed all the way in, adjust clevis rod to provide 10.34 inches minimum dimension between face of lower support bracket and center of clevis rod pin hole. Tighten clevis lockbolt. | |
| (7) Connect clevis to latch lever with clevis pin, washer, and cotter pin. | B |
| (8) Loosen parking brake switch mounting screws. Pivot switch so that the parking brake latch lever actuates the switch within 0.030 inch of full up position; tighten switch mounting screws. | C |
| NOTE: Full up position means when latch lever contacts lower edge of latch striker plate. | |
| (9) Perform Adjustment/Test Parking Brake Control - Functional Check (refer to 32-8-0). | |

2. Removal/Installation Parking Brake Switch (see Figure 201)

A. Equipment Required - None.

B. Preparation. Open and attach warning tags to the ANTI-SKID CONT and WARN circuit breakers, on main circuit breaker panel.

C. Remove Parking Brake Switch.

(1) Gain access to parking brake switch through left electrical "tunnel" compartment door.

(2) Disconnect wires connected to parking brake switch.

(3) Remove two screws, washers, and nuts attaching switch and switch actuator to mounting clip; remove switch and switch actuator.

D. Install Parking Brake Switch.

(1) Align switch and switch actuator with holes in mounting clip and install screws, washers, and nuts; do not tighten screws.

(2) Adjust switch so that parking brake latch actuates the switch within 0.030 inch of parking brake latch full up position; tighten switch mounting screws.

NOTE: Full up position means when latch lever contacts lower edge of latch striker plate.

(3) Connect correct wires to switch (refer to Wiring Diagram Manual).

(4) Remove warning tags and close ANTI-SKID CONT and WARN circuit breakers.

(5) Perform Adjustment/Test Parking Brake Control - Functional Check (refer to 32-8-0).

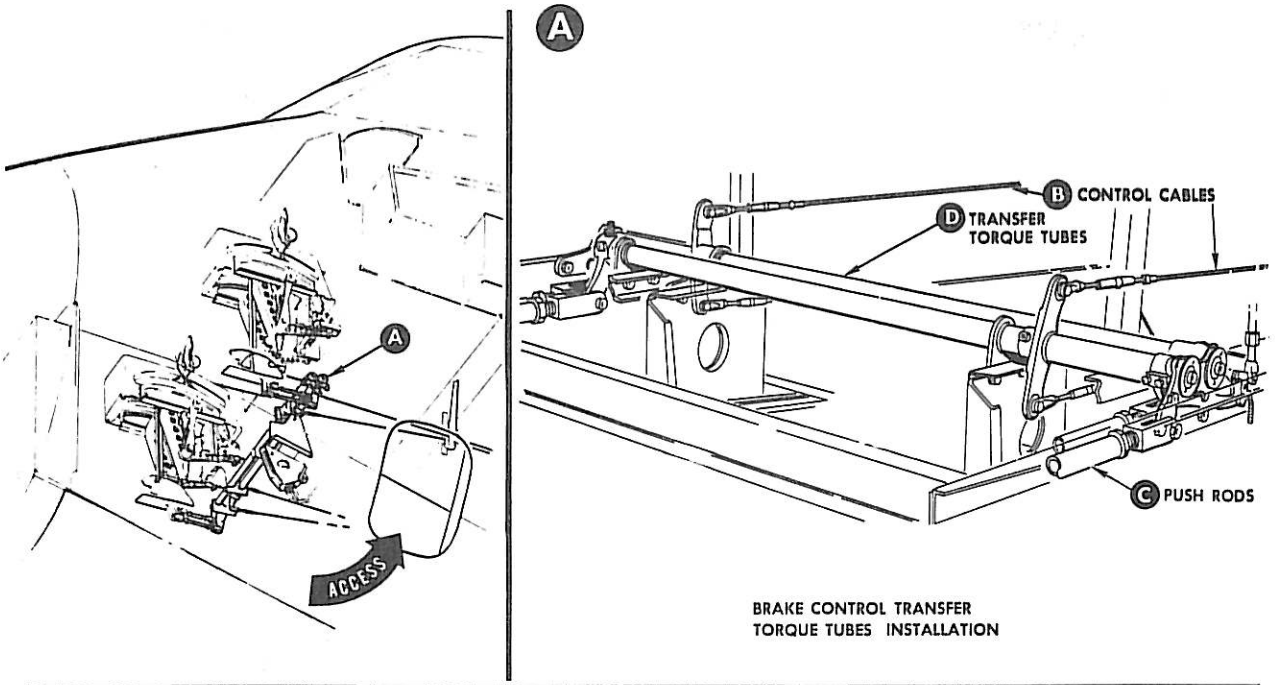
NOTE: If the parking brake switch only has been replaced and no other rigging or adjustment has been changed, operation can be checked per 32-8-0, steps 2.B.(2) thru 2.B.(5), 2.C.(3) thru 2.C.(5)(a), 2.C.(6) thru 2.C.(9), 2.C.(11), and 2.C.(12).

## BRAKE CONTROL TRANSFER TORQUE TUBES - MAINTENANCE PRACTICES

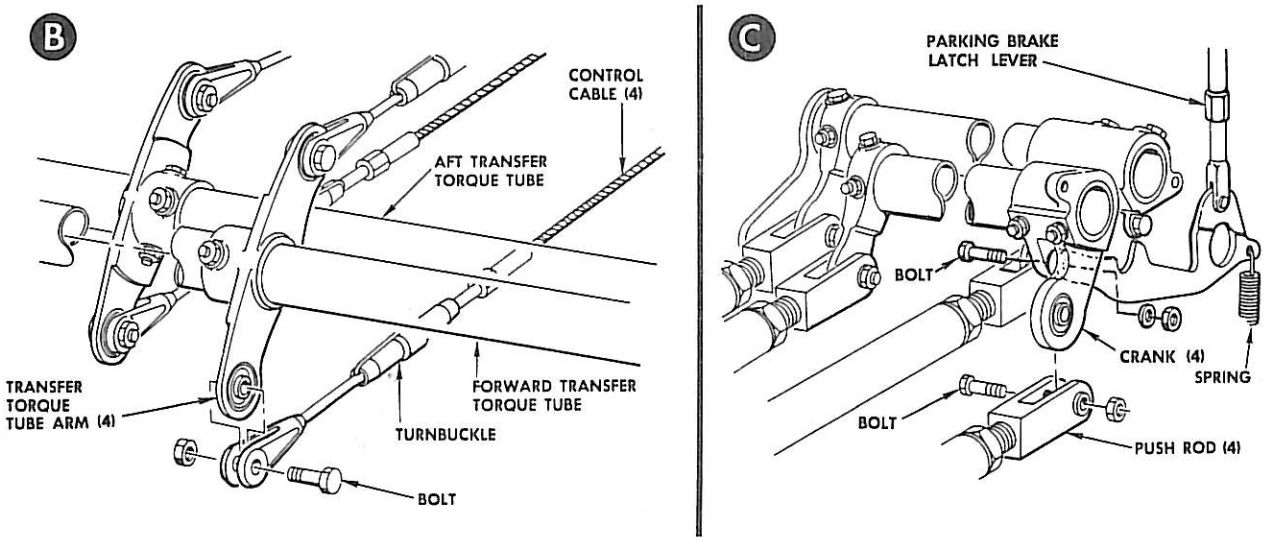
1. Removal/Installation Brake Control Transfer Torque Tubes (see Figure 201)

A. Equipment Required - None.

| | Figure Detail |
|---|---|
| B. Preparation. Gain access to the transfer torque tubes through the left and right-hand electrical "tunnel" compartment access doors. | |
| C. Remove Transfer Torque Tubes. | |
| (1) Identify and disconnect MLG brake metering valve control cables from transfer torque tube arms. | A,B |
| (2) Disconnect four push rods from torque tube cranks. | C |
| (3) Remove spring from parking brake latch lever and disconnect latch lever from arm on left end of forward torque tube. | C |
| (4) Disconnect bearing assemblies from support brackets by removing nuts and bolts; remove torque tubes. | D |
| D. Install Transfer Torque Tubes. | |
| (1) Place forward and aft torque tubes in correct position and install nuts and bolts that connect bearing assemblies to support brackets. | D |
| NOTE: Install one countersunk washer between left end of each torque tube and left-hand support bearings, with countersink facing torque tube. | |
| (2) Connect four push rods to torque tube cranks. | C |
| (3) Connect control cables from MLG brake metering valves to arms on torque tubes and rig normal brake controls (refer to 32-8-0, steps 1.C.(1) thru 1.C.(6)). | A,B |
| (4) Connect parking brake latch lever to crank on left end of forward torque tube and install spring. | C |




BRAKE CONTROL TRANSFER TORQUE TUBES INSTALLATION



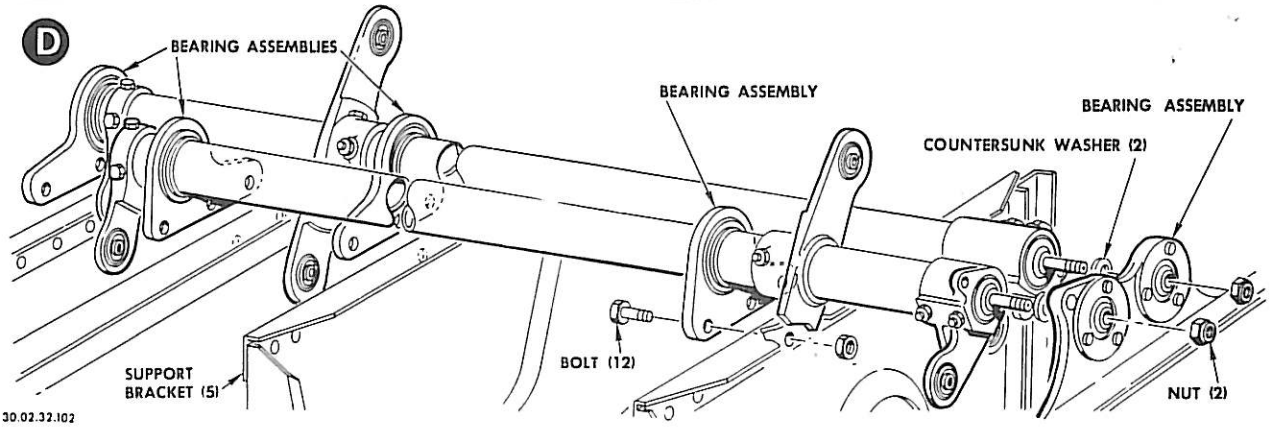



Figure
Detail

(5) Check parking brake latch lever and switch adjustment (refer to 32-8-10, steps 1.C.(6) thru 1.C.(8)).

(6) Deleted.

(7) Perform Adjustment/Test Normal Brake System - Functional Check (refer to 32-8-0).

NOTE: If the brake control transfer torque tubes only have been replaced and no other rigging or adjustment has been changed, operation can be checked per 32-8-0, steps 4.B.(3) thru 4.B.(5), 4.B.(9) thru 4.C.(8), 4.D.(1), 4.D.(2), 4.D.(5), and 4.D.(7).

## NOSE LANDING GEAR (NLG) BRAKING CONTROL SWITCHES - MAINTENANCE PRACTICES

1. Removal/Installation NLG Full Braking Control Switches (see Figure 201)

   A. Equipment Required - None.

   B. Preparation. Open and attach warning tag to ANTI-SKID NOSE POWER circuit breaker, on main circuit breaker panel.

   C. Remove NLG Full Braking Control Switch.

      (1) Gain access to the NLG full braking switches through the right electrical "tunnel" compartment door. Switches are actuated by the copilot's brake pedal linkage.

      (2) Disconnect electrical harness at quick disconnect on applicable switch.

      (3) Cut safety wire and remove hex nut that secures switch to bracket; remove switch.

   D. Install NLG Full Braking Control Switch.

      (1) Install NLG full braking switch on bracket with hex nuts and washers.

      (2) Connect electrical harness to switch at quick disconnect.

      (3) Adjust NLG full braking control switch (refer to 32-8-0, steps 1.C.(10) and 1.C.(11)(b)). Safety-wire hex nuts after adjustment.

      (4) Remove warning tag and close circuit breaker opened in step B.

      (5) Perform Adjustment/Test Normal Brake System - Functional Check (refer to 32-8-0).

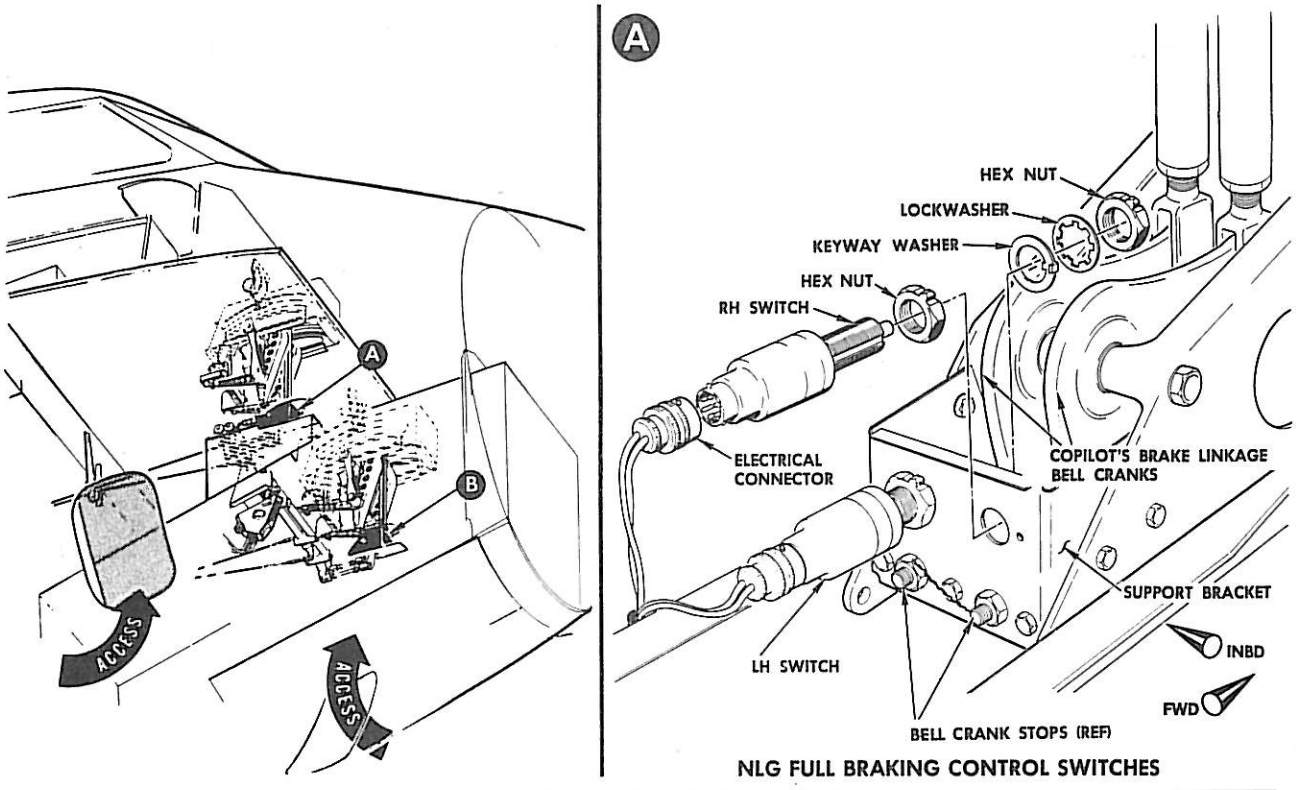
      NOTE: If only a NLG full braking control switch has been replaced and no other rigging or adjustment has been changed, operation can be checked per 32-8-0, steps 4.B.(3) thru 4.B.(5), 4.B.(9) thru 4.B.(15), 4.C.(7), 4.D.(1), 4.D.(2), 4.D.(5), and 4.D.(7).

2. Removal/Installation NLG Reduced Braking Control Switches (see Figure 201) (Applicable to *Group II airplanes CV5 thru CV24 only.)

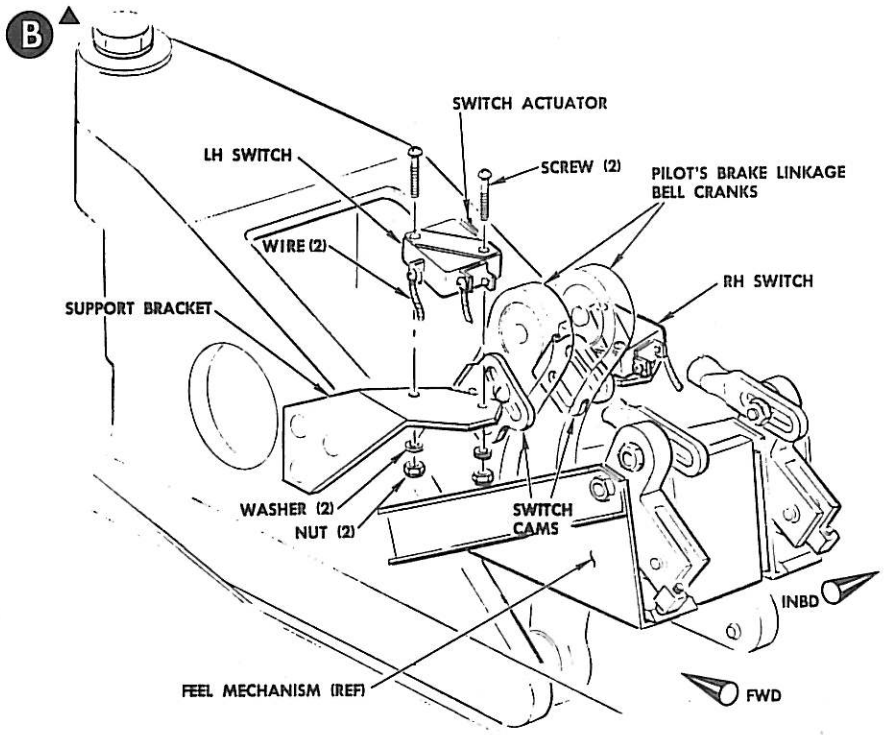
   A. Equipment Required - None.

   B. Preparation. Open and attach warning tag to ANTI-SKID NOSE POWER circuit breaker, on main circuit breaker panel.

*Refer to Manual INTRODUCTION for Explanation of Group Designations.




NLG FULL BRAKING CONTROL SWITCHES




NLG REDUCED BRAKING CONTROL SWITCHES

**NOTE:**
▲ APPLICABLE TO GROUP II AIRPLANES CV5 THRU CV24 ONLY.
REFER TO MANUAL INTRODUCTION FOR EXPLANATION OF GROUP DESIGNATIONS.

30.02.32.101A

C. Remove NLG Reduced Braking Control Switch.

(1) Gain access to the NLG reduced braking control switches through the left electrical "tunnel" compartment door. Switches are actuated by the pilot's brake pedal linkage.

(2) Identify and disconnect electrical wiring from terminals on applicable switch.

(3) Remove two nuts, washers, and screws securing switch to support bracket; remove switch and switch actuator.

D. Install NLG Reduced Braking Control Switch.

(1) Align switch and switch actuator with holes in support bracket and install two screws, washers, and nuts.

(2) Connect electrical wiring to switch terminals as identified in step C.(2).

(3) Adjust NLG reduced braking control switch (refer to 32-8-0, steps 1.C.(10) and 1.C.(12)(c)).

(4) Remove warning tag and close circuit breaker opened in step B.

(5) Perform Adjustment/Test Normal Brake System - Functional Check (refer to 32-8-0).

NOTE: If only a NLG reduced braking control switch has been replaced and no other rigging or adjustment has been changed, operation can be checked per 32-8-0, steps 4.B.(3) thru 4.B.(5), 4.B.(9) thru 4.B.(15), 4.C.(7), 4.D.(1), 4.D.(2), 4.D.(5), and 4.D.(7).

## NOSE WHEEL BRAKE SHUTOFF (WHEELS CENTERED) SWITCH - MAINTENANCE PRACTICES

1. Removal/Installation Nose Wheel Brake Shutoff Switch (see Figure 201)

   A. Equipment Required - None.

   B. Preparation. Open and attach warning tags to ANTI-SKID NOSE POWER, and WARN circuit breakers, on main circuit breaker panel.

   C. Remove Nose Wheel Brake Shutoff Switch.

      (1) Disconnect electrical harness to brake shutoff switch at quick disconnect.

      (2) Cut safety wire and remove bolts securing brake shutoff switch and adapter to nose wheel steering unit; remove shutoff switch and adapter.

      (3) Loosen locknut and remove switch from adapter.

   D. Install Nose Wheel Brake Shutoff Switch.

      (1) Install locknut on barrel nut (if removed) and thread barrel nut into adapter approximately six turns; snug locknut.

      (2) Install locknut on switch and thread switch into barrel nut approximately 10 complete turns; snug locknut.

      CAUTION: DO NOT SCREW SWITCH OR BARREL NUT IN BEYOND PRECEDING POSITION PRIOR TO SWITCH ADJUSTMENT, AS THIS COULD DAMAGE SWITCH.

      (3) Place spring on plunger and insert plunger and spring into adapter.

      (4) Install adapter on nose wheel steering unit and secure with three bolts and washers.

      (5) Perform Adjustment/Test Nose Wheel Brake Shutoff Switch.

      (6) Deleted.

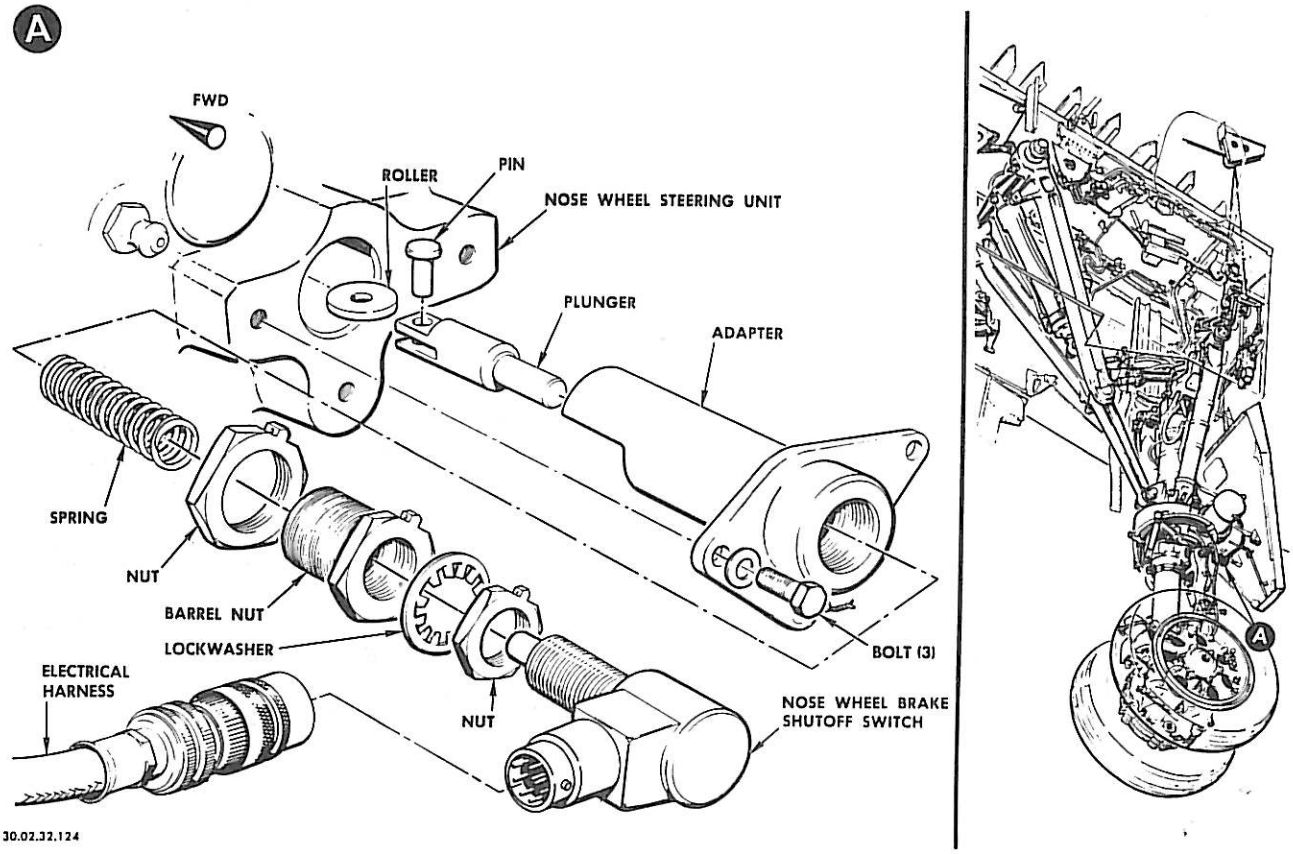
      (7) Deleted.

2. Adjustment/Test Nose Wheel Brake Shutoff Switch (see Figure 201)

   A. Equipment Required.

      (1) A protractor for measuring angular travel of the nose wheels.

      (2) Turntable capable of supporting the nose of airplane, to allow wheels to turn without scuffing tires.






Nose Wheel Brake Shutoff Switch Installation
Figure 201

B. Preparation.

(1) Install turntable under nose wheels and allow nose wheels to rest on turntable.

(2) Install protractor on nose landing gear.

C. Adjust Nose Wheel Brake Shutoff Switch.

(1) Manually rotate nose wheels 7 (±0.5) degrees to the right of neutral position.

(2) Cut safety wire and back off locknuts securing barrel nut and switch.

(3) Hold switch and thread barrel nut into adapter unit until switch actuates. Slowly back out barrel nut until switch deactuates; snug locknuts.

(4) Manually rotate nose wheels to the left. Switch must actuate 7 (±0.5) degrees left of neutral position. Tighten locknuts, and safety-wire.

(5) Perform Adjustment/Test Normal Brake System - Functional Check (refer to 32-8-0).

NOTE: If only the nose wheel brake shutoff switch adjustment has been changed, operation can be checked per 32-8-0, steps 4.B.(3), 4.B.(11) thru 4.B.(15), 4.C.(9) thru 4.C.(12), 4.D.(1), 4.D.(2), and 4.D.(5).

(6) Deleted.

(7) Deleted.

## MAIN LANDING GEAR (MLG) HYDRAULIC BRAKE PRESSURE INDICATING SYSTEM - MAINTENANCE PRACTICES

1. Removal/Installation MLG Hydraulic Brake Pressure Indicator (refer to Chapter 31, INSTRUMENTS)

2. Removal/Installation MLG Hydraulic Brake Pressure Transmitter (see Figure 201)

   A. Equipment Required - None.

   B. Preparation.

      (1) Reduce hydraulic pressure to 0 psig (refer to Chapter 12,SERVICING)

      (2) Open and attach warning tags to the following circuit breakers, on main circuit breaker panel:

      HYD BRAKE PRESS.

      HYD PUMP MOTOR CONT.

   C. Remove Brake Pressure Transmitter.

      (1) Gain access to brake pressure transmitter through the hydraulic compartment door. Transmitter is mounted on the forward bulkhead of the compartment, above the MLG selector valve.

      (2) Disconnect electrical harness from transmitter.

      (3) Disconnect hydraulic line from transmitter.

      (4) Loosen mounting clamp and slide transmitter inboard and out of support bracket.

      NOTE: Remove fitting from port of brake pressure transmitter and hold for installation on replacement transmitter; discard "O" ring.

   D. Install Brake Pressure Transmitter.

      (1) Install fitting in port of replacement brake pressure transmitter. Use new "O" ring for installation. ("O" ring must be soaked in Skydrol 500A hydraulic fluid prior to installation.)

      (2) Slide transmitter into support bracket from inboard side and connect hydraulic line to transmitter.

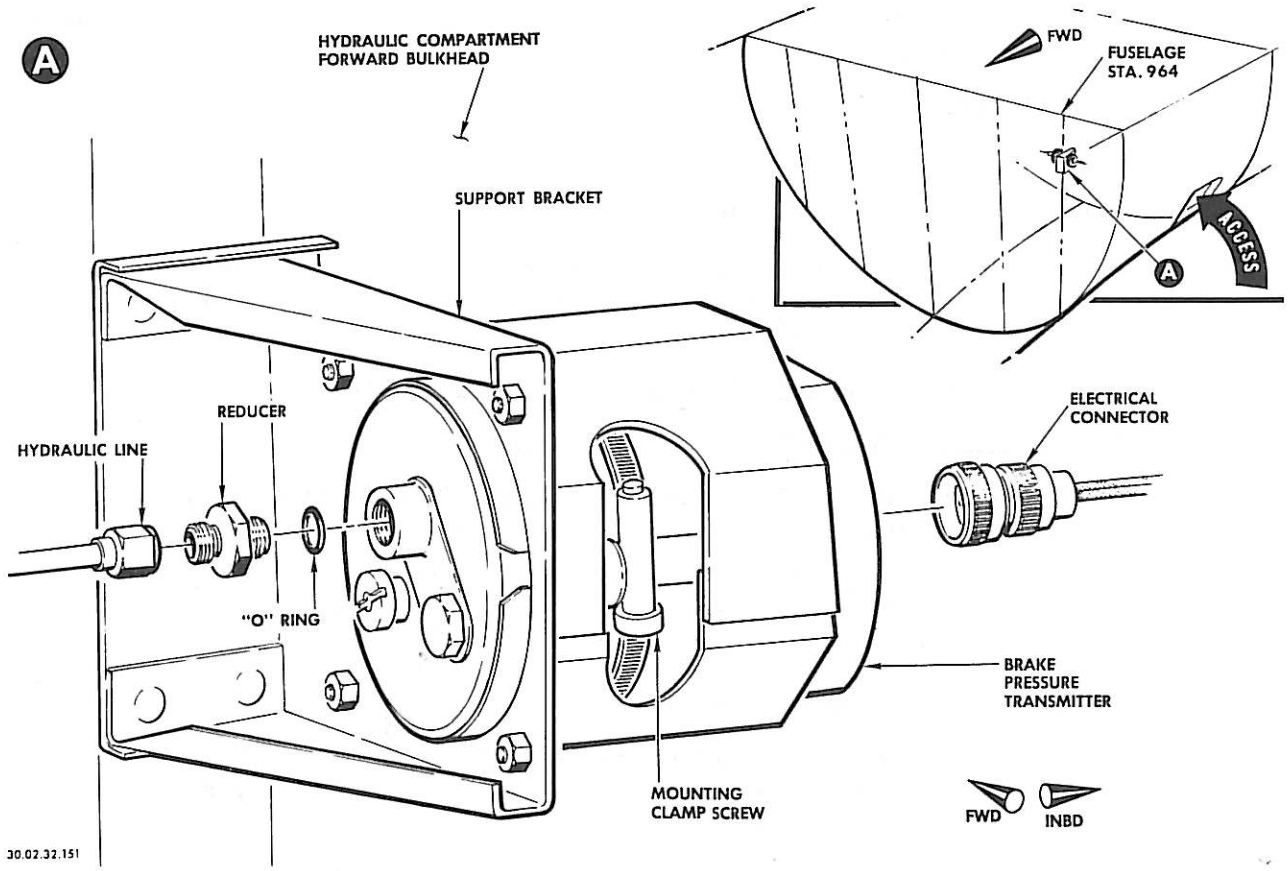
      (3) Tighten transmitter mounting clamp.

      (4) Connect electrical harness to transmitter.

      (5) Remove warning tags and close circuit breakers opened in step B.

      (6) Bleed transmitter line and check installation for leaks.

      (7) Perform Adjustment/Test Hydraulic Brake Pressure Indicator and MLG Brake Accumulator Relief-Check Valve - Functional Check (refer to 32-8-0).






Hydraulic Brake Pressure Transmitter Installation
Figure 201

CONVAIR MODEL 30

MAINTENANCE MANUAL

TEMPORARY REVISION NO. 32-53.

Insert facing 32-8-15, Page 201, dated Sep. 17/62 (or subsequent).

The instructions on the noted facing page are to be used for all applicable airplanes except as follows: for airplanes not modified per Service Bulletin No. 32-17, substitute the following NOTE where indicated.

Retain this temporary revision in your manual until all applicable airplanes have been modified per noted service bulletin.

Delete NOTE following step 1.D.(1) and replace with the following:

NOTE: Install filter with terminal "2" inboard.

## ANTISKID SYSTEM FILTER - MAINTENANCE PRACTICES

1. Removal/Installation Antiskid System Filter

A. Equipment Required - None.

B. Preparation. Open and attach warning tags to the ANTI-SKID MAIN POWER and CONT circuit breakers, on main circuit breaker panel.

C. Remove Antiskid System Filter.

(1) Gain access to the antiskid system filter in the right-hand main wheel well. The filter is mounted on the aft side of the fiberglas shroud in the top of the wheel well, outboard of the antiskid system control box.

(2) Remove four screws and washers securing the antiskid filter cover to the fiberglas shroud and remove cover.

(3) Identify and disconnect two wires from the terminals on filter.

(4) Remove four screws attaching antiskid system filter to the fiberglas shroud; remove filter.

D. Install Antiskid System Filter.

(1) Align the antiskid system filter with mounting provisions on aft side of the fiberglas shroud in right main wheel well; install four screws securing filter to the shroud.

NOTE: Install filter with terminal "2" inboard. Connect bonding jumper to the upper left-hand mounting screw.

(2) Connect two wires to the terminals of antiskid system filter, as identified in step C.(3).

(3) Position cover over filter and secure with four screws and washers.

(4) Remove warning tags and close circuit breakers opened in Step B.

(5) Perform Adjustment/Test Antiskid System - Functional Check (refer to 32-8-0).

CONVAIR MODEL 30

MAINTENANCE MANUAL

TEMPORARY REVISION NO. 32-66.

Insert facing 32-8-16, Page 201, dated Jan. 25/63 (or subsequent).

The instructions on noted facing page are applicable to all airplanes except as follows: for airplanes not modified per Service Bulletin No. 32-37, substitute the following information where indicated.

Retain this temporary revision in your manual until all applicable airplanes have been modified per noted service bulletin.

Delete NOTE below step 1.C.(1) and replace with the following:

NOTE: The antiskid system relays are on the station 306 relay panel, to the right and aft of the electronics compartment door. The NLG and MLG antiskid control relays are located near the center of the panel; the NLG inflight braking relay is mounted near the bottom.

## ANTISKID SYSTEM RELAYS - MAINTENANCE PRACTICES

1. Removal/Installation Antiskid System Relays

A. Equipment Required - None.

B. Preparation. Open and attach warning tags to the following circuit breakers, on main circuit breaker panel:

ANTI-SKID NOSE POWER, MAIN POWER, CONT, and WARN.

LANDING GEAR POS & WARN (Applicable to NLG inflight braking relay removal/installation only).

C. Remove Relay.

(1) Gain access to relay to be replaced.

NOTE: The NLG and MLG antiskid control relays are located on the sta 306 relay panel, near the center; the inflight braking relay is mounted near the bottom. The antiskid system test relay is mounted near the aft edge of the sta 310 relay panel. Both panels are located in the electronics compartment, aft of the compartment access door.

(2) Remove mounting screws and lockwashers securing relay.

(3) Remove relay.

D. Install Relay.

(1) Align relay locating pin(s) with socket and insert relay into socket.

(2) Install mounting screws and lockwashers.

(3) Remove warning tags and close circuit breakers opened in step B.

(4) Perform Adjustment/Test Antiskid System - Functional Check (refer to 32-8-0).

## NOSE LANDING GEAR (NLG) BRAKE PRESSURE REDUCER VALVE - MAINTENANCE PRACTICES

(This section, 32-8-17, is applicable to *Group II airplanes CV5 thru CV24 only.)

1. Removal/Installation NLG Brake Pressure Reducer Valve (see Figure 201)

A. Equipment Required - None.

B. Preparation.

(1) Reduce hydraulic pressure to 0 psig (refer to Chapter 12, SERVICING).

(2) Open and attach warning tag to the HYD PUMP MOTOR CONT circuit breaker, on main circuit breaker panel.

C. Remove NLG Brake Pressure Reducer Valve.

(1) Gain access to the NLG brake pressure reducer valve in nose wheel well. The valve is mounted on wheel well ceiling.

(2) Identify and disconnect three hydraulic lines from NLG brake pressure reducer valve.

(3) Remove two mounting bolts and washers and remove valve.

NOTE: Remove unions from ports of valve and hold for installation on replacement valve; discard "O" rings.

D. Install NLG Brake Pressure Reducer Valve.

(1) Install unions in ports of replacement brake pressure reducer valve. Use new "O" rings for installation. ("O" rings must be soaked in Skydrol 500A hydraulic fluid prior to installation.)

(2) Place NLG brake pressure reducer valve in position on mounting bracket and install two mounting bolts and washers. Do not tighten bolts at this time to permit alignment of hydraulic lines with valve.

(3) Connect three hydraulic lines to pressure reducer valve, as identified in step C.(2). Do not tighten line connections at this time.

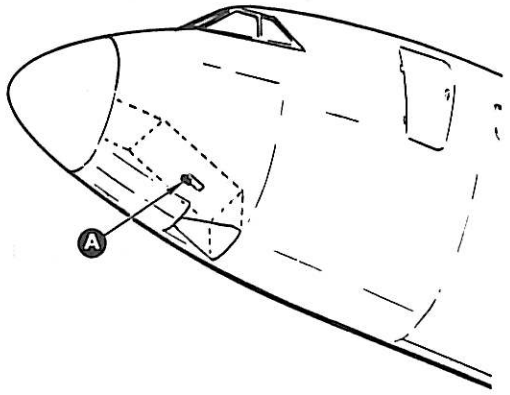
(4) Tighten mounting bolts installed in step (2) preceding; tighten three hydraulic lines connected in step (3) preceding.

(5) Remove warning tag and close HYD PUMP MOTOR CONT circuit breaker.

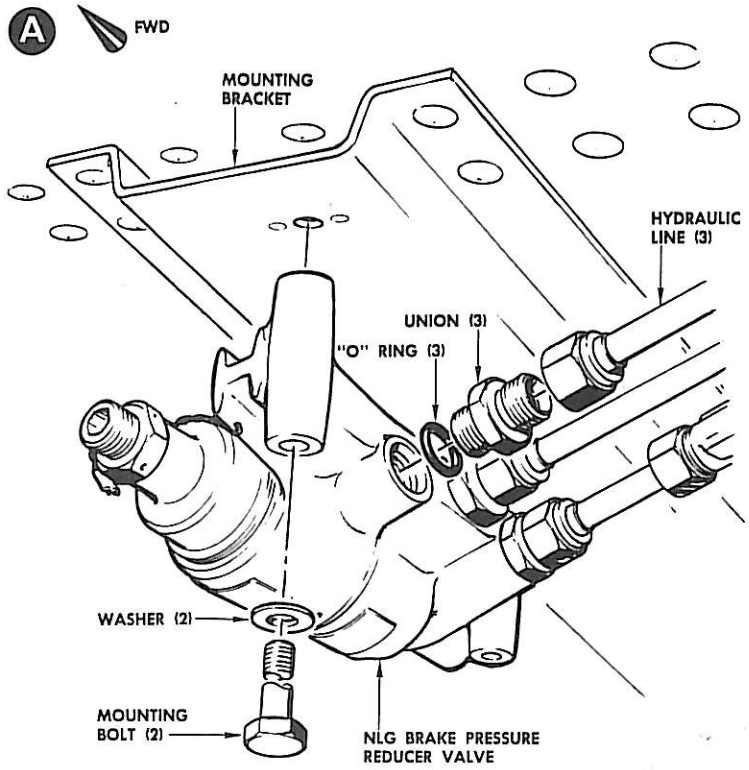
*Refer to Manual INTRODUCTION for Explanation of Group Designations.

(6) Perform Adjustment/Test Normal Brake System - Functional Check (refer to 32-8-0), and check valve for hydraulic leaks.

NOTE: If only the NLG brake pressure reducer valve has been replaced and no other rigging or adjustment has been changed, operation can be checked per 32-8-0, steps 4.B.(3) thru 4.B.(5), 4.B.(9), 4.B.(11) thru 4.B.(15), 4.C.(7), 4.D.(1), 4.D.(2), 4.D.(5), and 4.D.(7) (NLG only).




NOTE:
APPLICABLE TO GROUP II AIRPLANES CV5 THROUGH CV24 ONLY. REFER TO MANUAL INTRODUCTION FOR EXPLANATION OF GROUP DESIGNATIONS.




30.02.32.153

Nose Landing Gear Brake Pressure Reducer Valve Installation
Figure 201

## NOSE LANDING GEAR (NLG) REDUCED BRAKING CONTROL VALVE - MAINTENANCE PRACTICES

(This section, 32-8-18, is applicable to *Group II airplanes CV5 thru CV24 only.)

1. Removal/Installation NLG Reduced Braking Control Valve (see Figure 201)

   A. Equipment Required - None.

   B. Preparation.

      (1) Reduce hydraulic pressure to 0 psig (refer to Chapter 12, SERVICING).

      (2) Open and attach warning tags to the following circuit breakers, on main circuit breaker panel:

      ANTI-SKID NOSE POWER.

      HYD PUMP MOTOR CONT.

   C. Remove NLG Reduced Braking Control Valve.

      (1) Gain access to NLG reduced braking control valve on ceiling of nose wheel well.

      (2) Disconnect electrical harness from control valve.

      (3) Identify and disconnect two hydraulic lines from control valve.

      (4) Remove bolt, washer, spacer, and clamp at solenoid end of valve.

      (5) Remove two mounting bolts and washers securing reduced braking control valve to mounting bracket; remove valve.

      NOTE: Remove unions from ports of valve and hold for installation on replacement valve; discard "O" rings.

   D. Install NLG Reduced Braking Control Valve.

      (1) Install unions in ports of replacement valve. Use new "O" rings for installation. ("O" rings must be soaked in Skydrol 500A hydraulic fluid prior to installation.)

      (2) Align NLG reduced braking control valve with nutplates in mounting bracket in nose wheel well and install two bolts and washers. Do not tighten bolts at this time to permit alignment of hydraulic lines with valve.

      (3) Connect two hydraulic lines to reduced braking control valve, as identified in step C.(3). Do not tighten line connections at this time.

*Refer to Manual INTRODUCTION for Explanation of Group Designations.

(4) Tighten mounting bolts installed in step (2) preceding; tighten hydraulic lines connected in step (3) preceding.

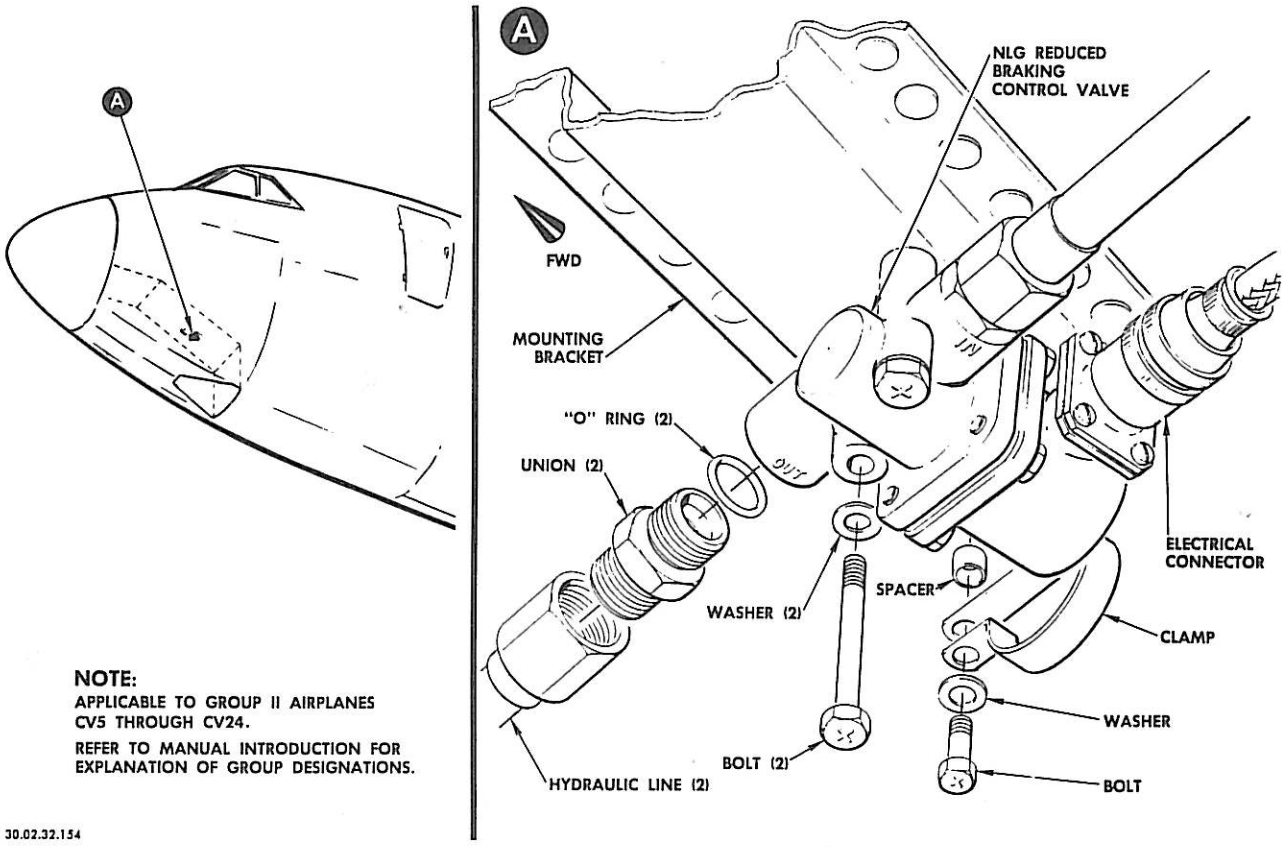
(5) Install clamp on aft end of valve and secure with bolt, washer, and spacer.

(6) Connect electrical harness to control valve.

(7) Remove warning tags and close circuit breakers opened in step B.

(8) Perform Adjustment/Test Normal Brake System - Functional Check (refer to 32-8-0), and check valve for hydraulic leaks.

NOTE: If only the NLG reduced braking control valve has been replaced and no other rigging or adjustment has been changed, operation can be checked per 32-8-0, steps 4.B.(3) thru 4.B.(5), 4.B.(9), 4.B.(11) thru 4.B.(15), 4.C.(7), 4.D.(1), 4.D.(2), 4.D.(5), and 4.D.(7) (NLG only).






Nose Landing Gear
Reduced Braking Control Valve Installation
Figure 201

## LANDING GEAR EMERGENCY BRAKE SYSTEM - DESCRIPTION AND OPERATION

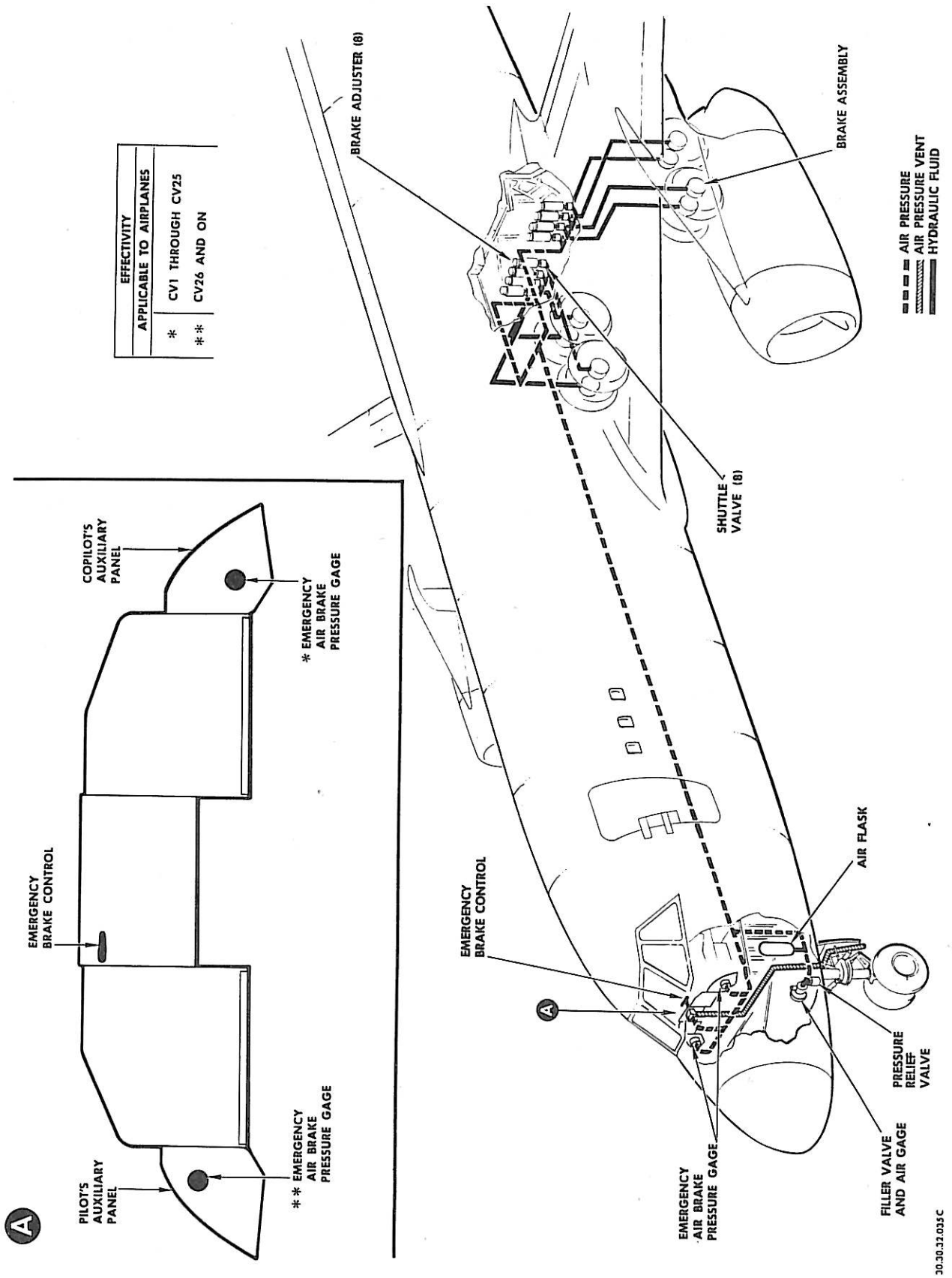
### 1. General

The landing gear emergency brake system provides an emergency means to pneumatically operate the MLG brakes; see Figure 1. Emergency braking is not available at the NLG. The system consists of an air storage flask, pressure relief valve, two pressure gages, a filler valve, and an emergency brake control valve. The storage flask has a volume of 300 cubic inches and is charged to 3000 psi; location is in the left electrical equipment "tunnel" compartment, aft of the access door. The pressure relief valve, also located in the left electrical equipment "tunnel" compartment, prevents over pressurizing the system. Relief valve "cracking" pressure is approximately 3450 psi.

The filler valve and one pressure gage are installed in the left side of the nose wheel well for system servicing. The remaining pressure gage is mounted on the *pilot's, or **copilot's, auxiliary instrument panel to provide a flight compartment indication of flask pressure.

The emergency brake control valve is located behind the upper left corner of the center instrument panel. It is spring and pressure loaded to the "off" position. Turning the valve handle clockwise routes pneumatic pressure through the shuttle valves to the brake assemblies. The pressure delivered to the brakes is in proportion to the amount the valve handle is turned. Releasing the valve handle vents the MLG brake lines overboard through the vent tubing on NLG fairing and releases the brakes. Approximately six complete brake applications are available before flask pressure is depleted. Anytime the emergency brake system is used, the MLG brakes must be bled at the earliest opportunity. Air left in the brake lines could cause the brakes to malfunction in subsequent hydraulic operations.

*Applicable to airplanes CV26 and on.
**Applicable to airplanes CV1 through CV25.






Landing Gear Emergency Brake System
Figure 1

## EMERGENCY BRAKE SYSTEM - MAINTENANCE PRACTICES

1. Servicing Emergency Brake System

Refer to Chapter 12, SERVICING for charging the emergency brake system air flask.

2. Adjustment/Test Emergency Brake System

A. Equipment Required. Two air pressure gages to measure brake pressures (0 to 2000 psig minimum).

NOTE: Gages shall be equipped with fittings to connect to MLG brake assemblies.

B. Preparation.

(1) Charge the emergency brake air flask (refer to Chapter 12, SERVICING). The air charging valve and nose wheel well gage are located on the left-hand side of the nose wheel well.

NOTE: The nose wheel well pressure gage and the * pilot's, or ** copilot's, pressure gage shall agree within ±100 psig.

(2) Reduce hydraulic pressure to 0 psig (refer to Chapter 12, SERVICING).

C. Emergency Brake System Test.

(1) Connect air pressure gage to a brake assembly on each MLG.

WARNING: DO NOT OPERATE EMERGENCY BRAKE HANDLE WHILE INSTALLING TEST GAGES.

(2) Break copper safety wire and rotate the emergency brake handle on pilots' center instrument panel clockwise.

(a) Force required to rotate handle full travel shall be 48 (±6) inch-pounds.

(b) MLG brake test gages shall indicate 1700 (±125) psig at full travel of handle.

(3) Release emergency brake handle. The test gages shall indicate 0 psig within 60 seconds from time emergency brake handle is returned to normal position.

(4) Repeat steps (2) and (3) six times minimum.

NOTE: The emegency air brake system shall be capable of performing at least six complete braking cycles. At sixth actuation of emegency brake handle, MLG brake test gages shall indicate 600 psig minimum.

*Applicable to airplanes CV26 and on.
**Applicable to airplanes CV1 through CV25 only.

(5) Remove all test equipment. Safety-wire emergency brake handle to screw below handle with 0.020-inch diameter copper wire.

(6) Bleed MLG brake hydraulic system (refer to 32-8-0).

(7) Recharge the emergency brake air flask (refer to Chapter 12, SERVICING).

## EMERGENCY AIR FLASK - MAINTENANCE PRACTICES

1. Servicing Emergency Air Flask (refer to Chapter 12, SERVICING)

2. Removal/Installation Emergency Air Flask (see Figure 201)

   A. Equipment Required - None.

   B. Materials Required. Bubble fluid, Specification MIL-L-25567.

   C. Preparation. Gain access to the emergency brake air flask filler valve on left side of the nose wheel well. Relieve air pressure by removing cap and slowly loosening the hex nut counterclockwise.

      WARNING: WHEN REMOVING VALVE CAP OR OPENING VALVE, HOLD VALVE BODY FIRMLY WITH WRENCH. A LOOSENED VALVE BODY COULD BE BLOWN OUT BY INTERNAL PRESSURE AND CAUSE SERIOUS INJURY OR FATALITY TO PERSONNEL.

   D. Remove Emergency Air Flask.

      (1) Gain access to the emergency air flask through the left electrical equipment "tunnel" compartment door.

      (2) Disconnect two air lines from the emergency air flask.

      (3) Disconnect straps that hold air flask in mounting support.

      (4) Remove air flask.

         NOTE: Remove fittings from ports of air flask and hold for installation on replacement air flask; discard "O" rings.

   E. Install Emergency Air Flask.

      (1) Install fittings in ports of replacement air flask. Use new "O" rings for installation.

      (2) Place air flask in position on mounting support and install straps.

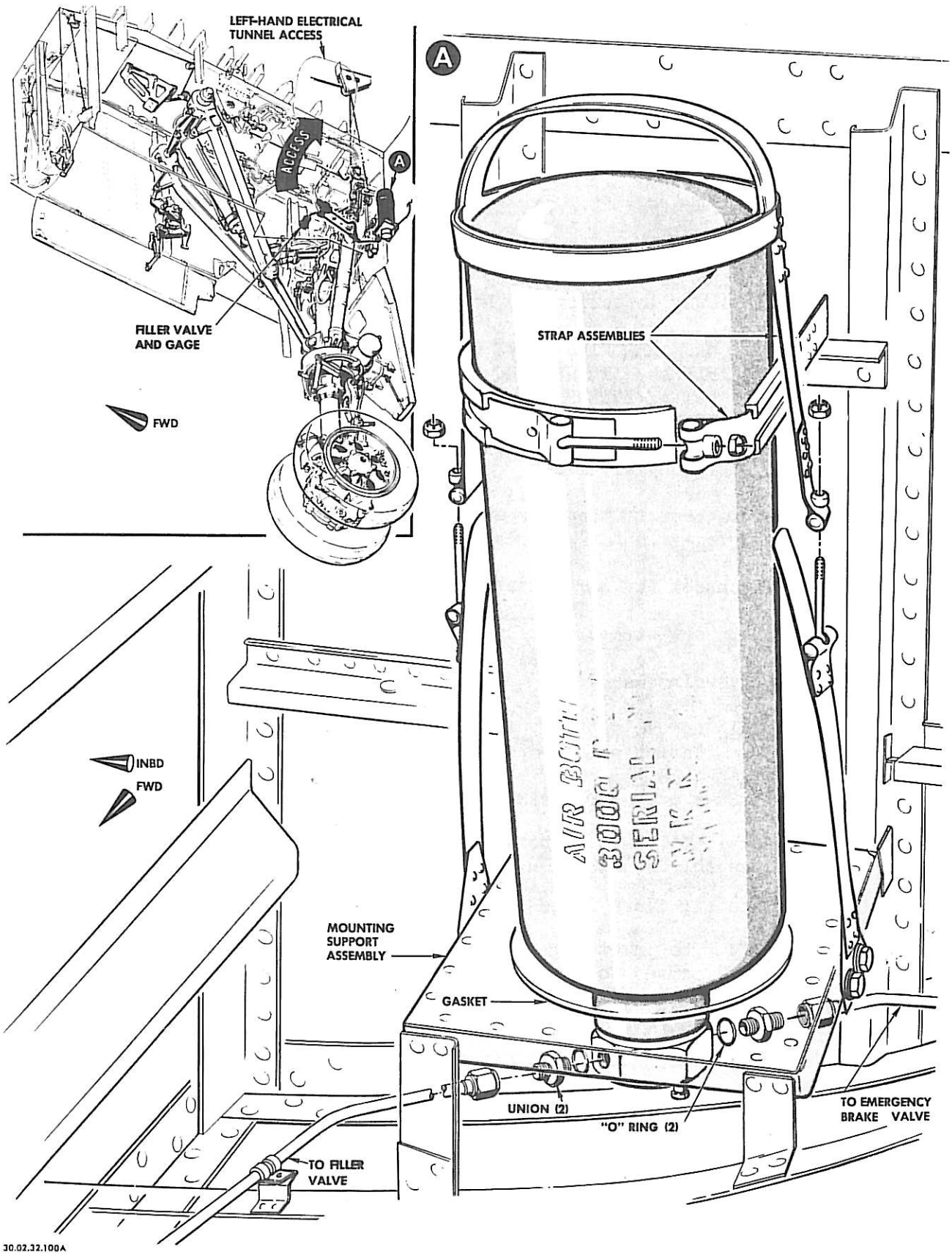
         NOTE: The inlet port of air flask shall align with air line connected to the pressure relief and filler valves.

      (3) Connect air lines to bottom of air flask.

      (4) Charge emergency brake air flask (refer to Chapter 12, SERVICING).

      (5) Check connections to air flask for leaks, using bubble fluid, Specification MIL-L-25567.

      (6) When test results are satisfactory, wipe bubble fluid from fittings, using a clean, water-dampened cloth.






Emergency Brake Air Flask Installation
Figure 201

## EMERGENCY BRAKE VALVE - MAINTENANCE PRACTICES

1. Removal/Installation Emergency Brake Valve (see Figure 201)

   A. Equipment Required - None.

   B. Materials Required. Bubble Fluid, Specification MIL-L-25567.

   C. Preparation. Relieve air pressure from emergency brake air flask (refer to 32-9-1).

      WARNING: ALL AIR PRESSURE MUST BE RELIEVED PRIOR TO REMOVING EMERGENCY BRAKE VALVE.

   D. Remove Emergency Brake Valve.

      (1) Gain access to the emergency brake valve in flight compartment. Valve is located behind the emergency air brake control handle, at the upper left corner of the center instrument panel.

      (2) Identify and disconnect three air pressure lines from emergency brake valve.

      (3) Break copper safety wire and remove emergency control handle by removing cotter pin, shear pin, and pulling handle off.

      (4) Remove three mounting screws and nuts that secure emergency brake valve to support bracket; remove emergency brake valve.

         NOTE: Remove fittings from ports of valve and hold for installation on replacement valve; discard "O" rings.

   E. Install Emergency Brake Valve.

      (1) Install fittings in ports of replacement emergency brake valve. Use new "O" rings for installation.

      (2) Place emergency brake valve in position behind support bracket and secure with three mounting screws and nuts.

      (3) Install control handle on valve and secure with shear pin and cotter pin.

      (4) Connect air lines to proper ports on brake valve as identified in step D.(2).

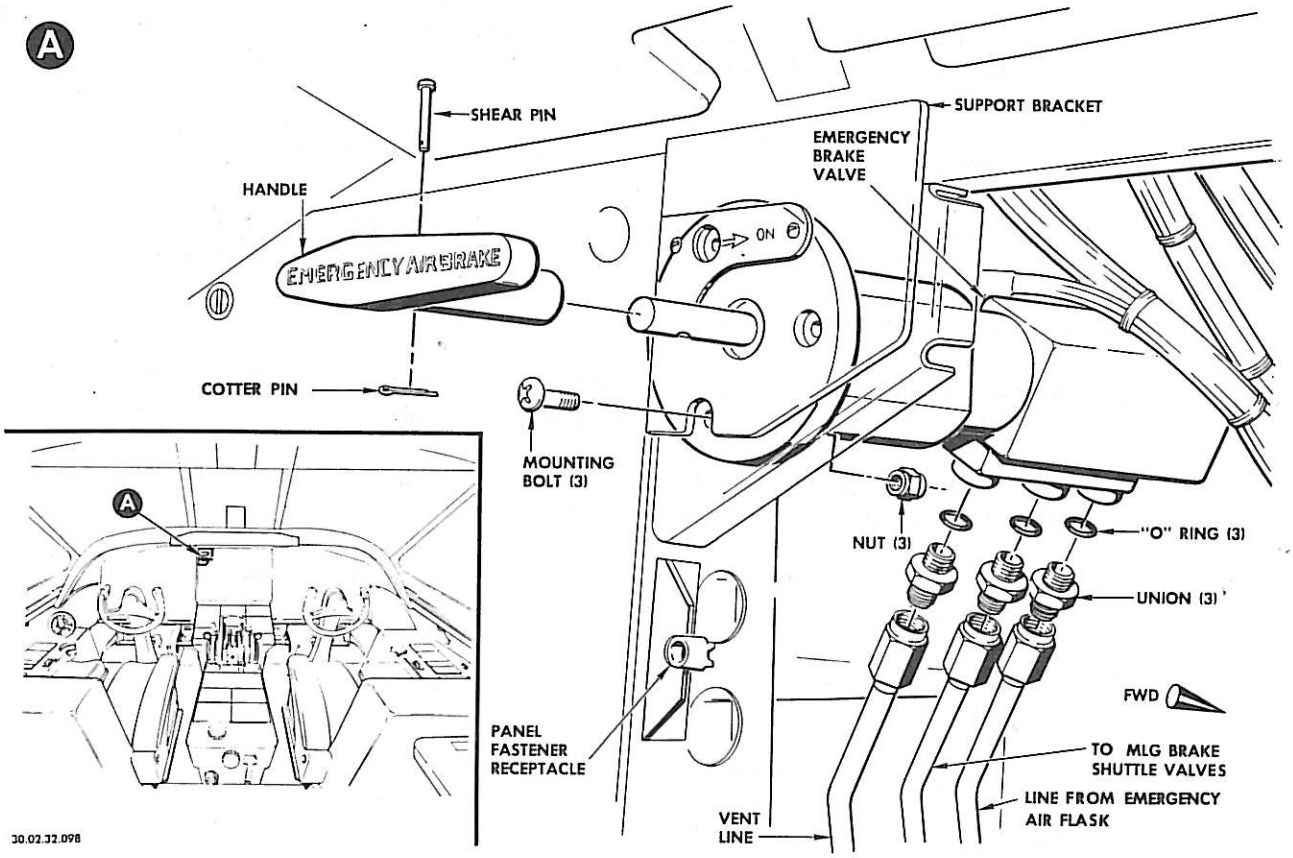
      (5) Charge emergency brake air flask (refer to Chapter 12, SERVICING).

      (6) Check connections to emergency brake valve for leaks using bubble fluid, Specification MIL-L-25567.

(7) Perform Adjustment/Test Emergency Brake System (refer to 32-9-0).

(8) When test results are satisfactory, wipe bubble fluid from fittings, using a clean, water-dampened cloth.

(9) Safety-wire emergency brake handle to screw below handle with 0.020-inch diameter copper wire.






Emergency Brake Valve Installation
Figure 201

## EMERGENCY BRAKE SYSTEM RELIEF VALVE - MAINTENANCE PRACTICES

1. Removal/Installation Emergency Brake System Relief Valve (see 32-9-0, Figure 1 for general location)

   A. Equipment Required - None.

   B. Materials Required. Bubble fluid, Specification MIL-L-25567.

   C. Preparation. Relieve air pressure from emergency brake air flask (refer to 32-9-1).

      WARNING: ALL AIR PRESSURE MUST BE RELIEVED PRIOR TO REMOVING EMERGENCY BRAKE SYSTEM RELIEF VALVE.

   D. Remove Emergency Brake System Relief Valve.

      (1) Gain access to the emergency brake system relief valve through the left electrical equipment "tunnel" compartment door. Valve is mounted on the left side of nose wheel well at fuselage sta 230.

      (2) Remove screw and clamp attaching relief valve to bracket on side of nose wheel well.

      (3) Disconnect air pressure line from relief valve; remove relief valve.

   E. Install Emergency Brake System Relief Valve.

      (1) Install clamp on relief valve and connect valve to air pressure line in left electrical equipment "tunnel" compartment.

      (2) Secure clamp to bracket on side of nose wheel well.

      (3) Charge emergency brake air flask (refer to Chapter 12, SERVICING).

      (4) Leak test the emergency brake system relief valve installation, using bubble fluid, Specification MIL-L-25567.

      (5) When test results are satisfactory, wipe bubble fluid from valve and tube fittings, using a clean, water-dampened cloth.

EMERGENCY BRAKE SYSTEM PRESSURE GAGES - MAINTENANCE PRACTICES

1. Removal/Installation Emergency Brake System Pressure Gage - Flight Compartment (refer to Chapter 31, INSTRUMENTS)

2. Removal/Installation Emergency Brake System Pressure Gage - Nose Wheel Well (refer to 32-9-0, Figure 1 for general location)

   A. Equipment Required - None.

   B. Materials Required. Bubble fluid, Specification MIL-L-25567.

   C. Preparation. Relieve air pressure from emergency brake air flask (refer to 32-9-1).

      WARNING: ALL AIR PRESSURE MUST BE RELIEVED PRIOR TO REMOVING PRESSURE GAGE.

   D. Remove Pressure Gage.

      (1) Gain access to the emergency brake system pressure gage in the nose wheel well, left-hand side.

      (2) Hold pressure gage with wrench and loosen fitting at base of gage; unscrew gage counterclockwise.

   E. Install Pressure Gage.

      (1) Screw pressure gage into fitting on emergency air flask filler fitting in nose wheel well. Hold pressure gage so that dial can be read and tighten fitting securing pressure gage to filler fitting.

      (2) Charge emergency brake air flask (refer to Chapter 12, SERVICING).

      (3) Leak test pressure gage installation, using bubble fluid, Specification MIL-L-25567.

      (4) When test results are satisfactory, wipe bubble fluid from pressure gage connection, using a clean, water-dampened cloth.

# LANDING GEAR POSITION AND WARNING SYSTEM - DESCRIPTION AND OPERATION

## 1. General

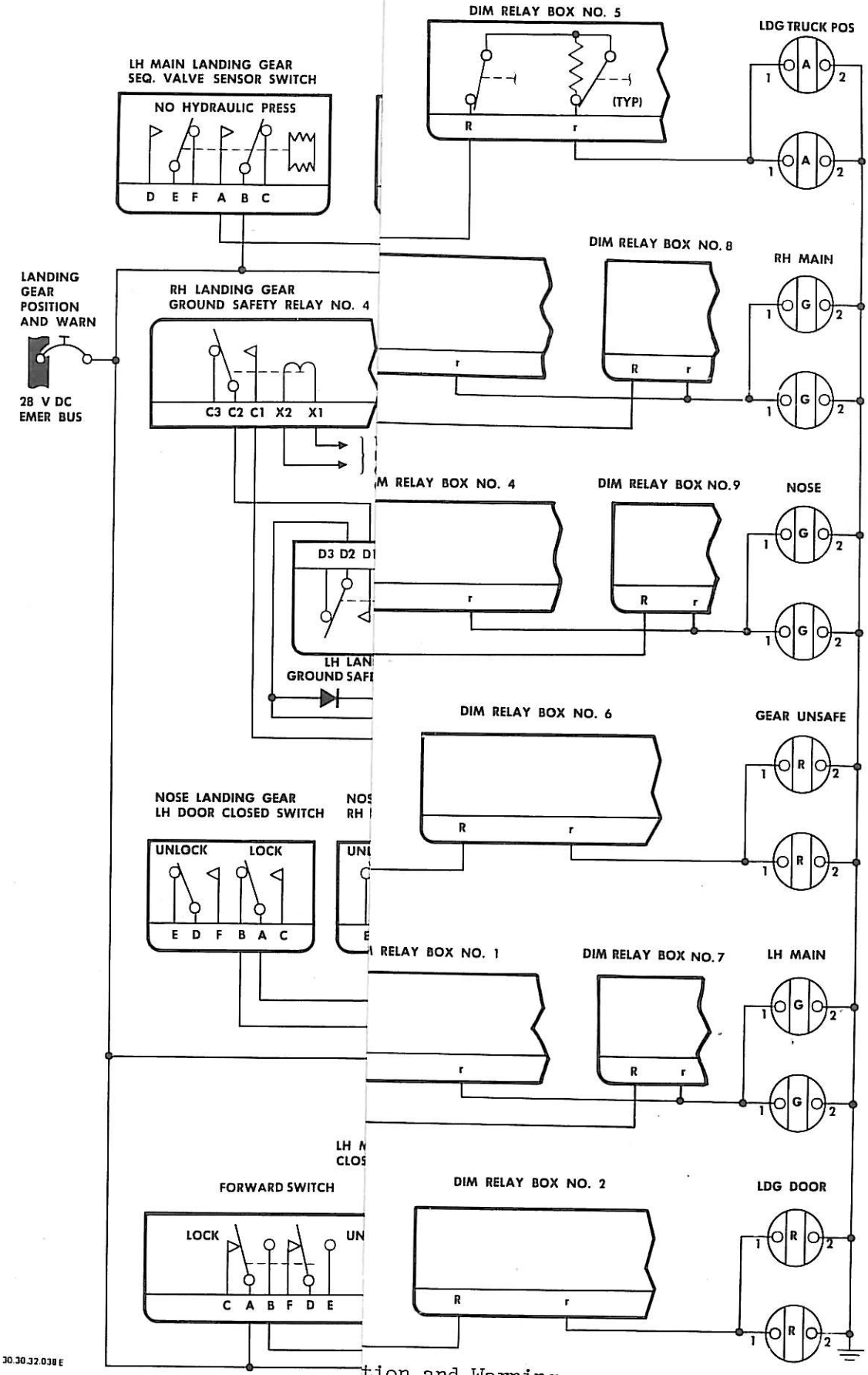
The landing gear position and warning system is a visual warning system that indicates safe and unsafe positions of the landing gear and landing gear control lever, and when any landing gear door is not closed and locked. The system also indicates when the main landing gear trucks are not in the proper position for retraction, and when a main landing gear sequence valve or sequence valve actuating linkage malfunctions.

The system consists of six visual indicator lights, two main landing gear sequence valve sensor switches, landing gear down-lock and up-lock switches, landing gear door closed-and-locked switches, and main landing gear truck position switches; see Figure 1. The indicator lights each have two bulbs wired in parallel so that a warning indication is assured even though one bulb fails. The lights are mounted adjacent to the landing gear control lever on the right side of the pilots' center instrument panel and are labeled, from left to right, LH MAIN, NOSE, RH MAIN, GEAR UNSAFE, LDG TRUCK POS, and LDG DOOR. See 32-0, Figure 2 for location of indicator lights on the pilots' center instrument panel. The LH MAIN, NOSE, and RH MAIN indicators are green; they illuminate only when the corresponding gear is down and locked. The LDG TRUCK POS indicator is amber; the GEAR UNSAFE and LDG DOOR indicators are red.

The GEAR UNSAFE indicator illuminates when any one of the following conditions exist: The landing gears are not up and locked or down and locked, and/or the landing gear control lever is not down and locked with the airplane groundborne. The GEAR UNSAFE indicator normally illuminates when the gear is in transit, and will remain illuminated when one or more of the gear fails to travel to the selected position.

The LDG TRUCK POS indicator illuminates when one or both of the main landing gear trucks is not properly positioned for gear retraction, or when either main landing gear sequence valve malfunctions or is not properly positioned for gear retraction. The LDG TRUCK POS indicator normally remains illuminated when the airplane is groundborne and when the main landing gear is in transit to the down-and-locked position.

The LDG DOOR indicator illuminates when any one of the landing gear doors is not closed and locked when the landing gear is retracted. With the landing gear extended, the LDG DOOR indicator illuminates only when the MLG doors are not closed and locked. The NLG doors are rigged to droop when gear is extended, and the NLG door switch circuit is isolated by the NLG stowed switch to prevent a false door warning indication. The LDG DOOR indicator, like the GEAR UNSAFE indicator, normally illuminates while the gear is in transit.

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## LANDING GEAR POSITION AND WARNING SYSTEM - TROUBLE SHOOTING

| POSSIBLE CAUSE | ISOLATION PROCEDURE AND CORRECTION |
|---|---|
| **1. LANDING GEAR POSITION LIGHTS FAIL TO ILLUMINATE** | |
| A. Faulty Circuit Breaker. | Check the LANDING GEAR POS & WARN circuit breaker for continuity. If there is no continuity, replace circuit breaker. |
| B. No power on the 28-volt dc emergency bus. | Check for power on the 28-volt dc emergency bus. If there is no power, refer to Chapter 24, ELECTRICAL POWER. |
| **2. NOSE LANDING GEAR DOWN-AND-LOCKED INDICATOR LIGHT OUT WHEN GEAR IS DOWN AND LOCKED** | |
| A. NLG down-lock up-lock switch not adjusted properly. | Depress plunger on NLG down-lock up-lock switch. If light illuminates, switch is out of adjustment. Adjust switch. |
| B. Indicator light bulbs burned out. | Test bulbs. Replace burned out bulbs. |
| C. Defective dim relay box No. 4 and 9. | Refer to Chapter 31, INSTRUMENTS for source of trouble. |
| D. Broken wire (open circuit) or defective NLG down-lock up-lock switch or NLG stowed switch. | Check for power at "R" on electrical plug of warning light dim relay box No. 4 or 9. If there is power at "R", jumper to "r" on electrical plug. If there is no light, the circuit is open between warning light dim relay boxes and indicator light. Repair or replace wire.<br><br>If there is no power at "R" on electrical plug, open LANDING GEAR POS & WARN circuit breaker and check for continuity through pins "G" and "J" of the NLG down-lock up-lock switch, and through pins "D" and "E" of the NLG stowed switch. If switches are okay, check for broken wire between applicable warning light dim relay boxes and circuit breaker. Repair or replace wire. Replace switch(es) if defective. |

| POSSIBLE CAUSE | ISOLATION PROCEDURE AND CORRECTION |
|---|---|
| **3. NOSE LANDING GEAR DOWN-AND-LOCKED INDICATOR LIGHT ON WHEN GEAR IS UP AND LOCKED** | |
| A. NLG stowed switch not adjusted properly or defective. | Depress plunger on NLG stowed switch. If light extinguishes, switch is out of adjustment. Adjust switch. If light does not extinguish, replace switch. |
| **4. LEFT MAIN GEAR DOWN-AND-LOCKED INDICATOR LIGHT OUT WHEN GEAR IS DOWN AND LOCKED** | |
| A. Left MLG down-lock switch not adjusted properly. | Depress plunger on left MLG down-lock switch. If light illuminates, switch is out of adjustment. Adjust switch. |
| B. Indicator light bulbs burned out. | Test bulbs. Replace burned out bulbs. |
| C. Defective dim relay box No. 1 and 7. | Refer to Chapter 31, INSTRUMENTS for source of trouble. |
| D. Broken wire (open circuit) or defective left MLG down-lock switch. | Check for power at "R" on electrical plug of warning light dim relay box No. 1 or 7. If there is power at "R", jumper to "r" on electrical plug. If there is no light, the circuit is open between dim relay boxes and indicator light. Repair or replace wire.<br><br>If there is no power at "R" on electrical plug, open LANDING GEAR POS & WARN circuit breaker and check for continuity through pins "G" and "J" of the left MLG down-lock switch. If switch is okay, check for broken wire between applicable warning light dim relay boxes and circuit breaker. Repair or replace wire. Replace switch if defective. |
| **5. LEFT MAIN LANDING GEAR DOWN-AND-LOCKED INDICATOR LIGHT ON WHEN GEAR IS NOT DOWN AND LOCKED.** | |
| A. Left MLG down-lock switch defective. | Open LANDING GEAR POS & WARN circuit breaker and check for continuity through pins "G" and "J" of the left MLG down-lock switch. |

| POSSIBLE CAUSE | ISOLATION PROCEDURE AND CORRECTION |
|---|---|
| 5. LEFT MAIN LANDING GEAR DOWN-AND-LOCKED INDICATOR LIGHT ON WHEN GEAR IS NOT DOWN AND LOCKED (CONT) | |
| | NOTE: Continuity check to be accomplished with switch deactuated.<br><br>If continuity exists, switch is defective. Replace switch. |
| 6. RIGHT MAIN LANDING GEAR DOWN-AND-LOCKED INDICATOR LIGHT OUT WHEN GEAR IS DOWN AND LOCKED | |
| A. Refer to left main landing gear down-and-locked indicator light trouble shooting for possible causes. | Refer to left main landing gear down-and-locked indicator light trouble shooting for isolation procedure and correction. Substitute right for left MLG down-lock switch and warning light dim relay box No. 3 and 8 for No. 1 and 7. |
| 7. RIGHT MAIN LANDING GEAR DOWN-AND-LOCKED INDICATOR LIGHT ON WHEN GEAR IS NOT DOWN AND LOCKED | |
| A. Refer to left main landing gear down-and-locked indicator light trouble shooting for possible causes. | Refer to left main landing gear down-and-locked indicator light trouble shooting for isolation procedure and correction. Substitute right for left MLG down-lock switch and warning light dim relay box No. 3 and 8 for No. 1 and 7. |
| 8. GEAR UNSAFE WARNING LIGHT ON WITH ALL LANDING GEAR DOWN AND LOCKED | |
| A. Landing gear control lever not in DOWN position. | Check that landing gear control lever is in DOWN position. |
| B. Landing gear down-lock switch(es) out of adjustment or defective. | Depress plunger on landing gear down-lock switches. If GEAR UNSAFE light extinguishes, adjust switch(es). If light does not extinguish, open LANDING GEAR POS & WARN circuit breaker and check for continuity through pins "G" and "H" of MLG down-lock switches, and pins "K" and "L" of NLG down-lock up-lock switch.<br><br>If there is continuity, replace defective switch(es). |
| C. NLG stowed switch defective. | Open LANDING GEAR POS & WARN circuit breaker and check for continuity through pins "A" and "C" of the NLG stowed switch. If there is continuity, replace switch. |

| POSSIBLE CAUSE | ISOLATION PROCEDURE AND CORRECTION |
|---|---|
| **9. GEAR UNSAFE WARNING LIGHT OUT WITH GEAR IN TRANSIT** | |
| A. GEAR UNSAFE warning light bulbs burned out. | Test bulbs. Replace burned out bulbs. |
| B. Defective dim relay box No. 6. | Refer to Chapter 31, INSTRUMENTS for source of trouble. |
| C. Landing gear up-lock or down-lock switch(es) defective. | Open LANDING GEAR POS & WARN circuit breaker and check for continuity through pins "A" and "B" of MLG up-lock switches, and pins "G" and "H" of MLG down-lock switches. Check pins "K" and "L" of NLG down-lock up-lock switch.<br><br>NOTE: Continuity checks to be accomplished with switches deactuated.<br><br>If there is no continuity, replace defective switch(es). |
| D. Broken wire (open circuit). | Check for electrical power at "R" on electrical plug to warning light dim relay box No. 6. If there is electrical power at "R", jumper to "r" on electrical plug. If the dim relay box is okay and there is no light, locate and repair or replace broken wire between warning light dim relay and indicator light.<br><br>If there is no power at "R" on electrical plug, open LANDING GEAR POS & WARN circuit breaker and check for continuity between warning light dim relay box No. 6 and circuit breaker. If there is no continuity and switches are okay, check for broken wire. Repair or replace wire. |
| **10. GEAR UNSAFE WARNING LIGHT ON WITH ALL LANDING GEAR UP AND LOCKED** | |
| A. Landing gear up-lock switch(es) out of adjustment or defective. | Depress plunger on landing gear up-lock switches. If GEAR UNSAFE light extinguishes, adjust switch(es). If light does not extinguish, open LANDING GEAR POS & WARN circuit breaker and |

| POSSIBLE CAUSE | ISOLATION PROCEDURE AND CORRECTION |
|---|---|

10. GEAR UNSAFE WARNING LIGHT ON WITH ALL LANDING GEAR UP AND LOCKED (CONT)

| | |
|---|---|
| | check continuity through pins "A" and "B" of MLG up-lock switches. Check pins "K" and "L" of NLG down-lock up-lock switch. If there is continuity, replace defective switch(es). |

11. LANDING GEAR DOOR WARNING LIGHT IS ON WHEN LANDING GEAR IS UP AND LOCKED AND DOORS ARE CLOSED AND LOCKED

| | |
|---|---|
| A. Landing gear door closed-and-locked switch(es) out of adjustment or defective. | Depress plunger of landing gear door closed-and-locked switches. If LDG DOOR light extinguishes, adjust switch(es). If light does not extinguish, open LANDING GEAR POS & WARN circuit breaker and check for continuity between pins "A" and "B" of landing gear door switches. If there is continuity, replace defective switch(es). |

12. LANDING GEAR DOOR WARNING LIGHT IS ON WHEN LANDING GEAR IS DOWN AND LOCKED AND DOORS ARE CLOSED AND LOCKED

| | |
|---|---|
| A. NLG stowed switch defective. | Open LANDING GEAR POS & WARN circuit breaker and check for continuity through pins "D" and "F" of NLG stowed switch. If there is continuity, a defective switch is indicated. Replace defective switch. |
| B. MLG door closed-and-locked switch(es) out of adjustment or defective. | Depress plunger of MLG door closed-and-locked switches. If LDG DOOR light extinguishes, adjust switch(es). If light does not extinguish, open LANDING GEAR POS & WARN circuit breaker and check for continuity through pins "A" and "B" of MLG door closed-and-locked switches. If there is continuity, a defective switch is indicated. Replace defective switch(es). |

13. LANDING GEAR DOOR WARNING LIGHT IS OUT WHEN DOORS ARE OPEN

| | |
|---|---|
| A. Landing gear door warning light bulbs burned out. | Test bulbs. Replace burned out bulbs. |
| B. Defective dim relay box No. 2. | Refer to Chapter 31, INSTRUMENTS for source of trouble. |

| POSSIBLE CAUSE | ISOLATION PROCEDURE AND CORRECTION |
|---|---|
| **13. LANDING GEAR DOOR WARNING LIGHT IS OUT WHEN DOORS ARE OPEN (CONT)** | |
| C. Broken wire (open circuit) or defective switch(es). | Check for power at "R" on electrical plug of warning light dim relay No. 2. If there is power at "R", jumper to "r" on electrical plug. If there is no light, the circuit is open between dim relay box and warning light. Repair or replace wire.<br><br>If there is no power at "R" on electrical plug, open LANDING GEAR POS & WARN circuit breaker and check for continuity through pins "A" and "B" of door closed-and-locked switches. If there is continuity, replace switch(es). If there is no continuity, check for broken wire between dim relay box and circuit breaker. Repair or replace wire. |
| **14. TRUCK POSITION WARNING LIGHT ON WITH TRUCK IN NEUTRAL POSITION** | |
| A. Truck position switch out of adjustment. | Check adjustment of switch by disconnecting linkage at switch arm and actuating switch. If light goes out adjust switch as required. |
| B. Truck position switch defective. | Check switch by disconnecting linkage at switch arm and actuating switch. If light stays on, switch is defective. Remove and replace switch. |
| C. MLG sequence valve(s) not functioning properly or sequence valve sensor switch(es) malfunctioning. | Check MLG sequence valve operation and adjust as required (refer to 32-13-0). Replace sequence valve(s) and/or actuating linkage if found defective.<br><br>If MLG sequence valve operation is satisfactory, check sensor switch operation. Replace sensor switch(es) if defective. |
| **15. TRUCK POSITION WARNING LIGHT OUT WITH TRUCK NOT IN NEUTRAL POSITION** | |
| A. Truck position warning light bulbs burned out. | Test bulbs. Replace burned out bulbs. |

| POSSIBLE CAUSE | ISOLATION PROCEDURE AND CORRECTION |
|---|---|
| 15. TRUCK POSITION WARNING LIGHT OUT WITH TRUCK NOT IN NEUTRAL POSITION (CONT) | |
| B. Truck position switch(es) out of adjustment. | Check adjustment of switches by disconnecting linkage at switch arm and actuating switch. If light comes on, adjust switch as necessary. |
| C. Defective dim relay box No. 5. | Refer to Chapter 31, INSTRUMENTS for source of trouble. |
| D. Broken wire (open circuit) or defective switch. | Check for power at "R" on electrical plug to warning light dim relay box No. 5. If there is power at "R", jumper to "r" on electrical plug. If there is no light, the circuit is open between relay box and light. Repair or replace wire.<br><br>If there is no power at "R" on electrical plug, open LANDING GEAR POS & WARN circuit breaker. Actuate each truck position switch and check for continuity through pins "A" and "C". If there is no continuity, a defective switch is indicated. Replace defective switch(es). If switches are okay, check for a broken wire. Repair or replace wiring. |

## MAIN LANDING GEAR (MLG) TRUCK POSITION SWITCHES - MAINTENANCE PRACTICES

1. Removal/Installation MLG Truck Position Switch (see Figure 201)

A. Equipment Required - None.

B. Preparation. Open and attach warning tags to the following circuit breakers, on main circuit breaker panel:

LANDING GEAR POS & WARN.

LANDING GEAR HANDLE SOLENOID.

C. Remove MLG Truck Position Switch.

(1) Remove three bolts securing protective cover on truck position switch; remove cover and spacers.

(2) Remove harness clamp securing electrical harness to switch support bracket on MLG shock strut.

(3) Disconnect electrical harness at quick disconnect on switch.

(4) Disconnect switch arm from truck pivot lever arm link.

(5) Remove four bolts and washers securing switch to support bracket on MLG shock strut; remove switch.

D. Install MLG Truck Position Switch.

(1) Position truck position switch on switch support bracket and secure with four bolts and washers.

(2) Connect switch arm to truck pivot lever arm link with bolt, washer, and nut. Torque nut finger-tight and secure with cotter pin.

(3) Connect electrical harness to switch at quick disconnect.

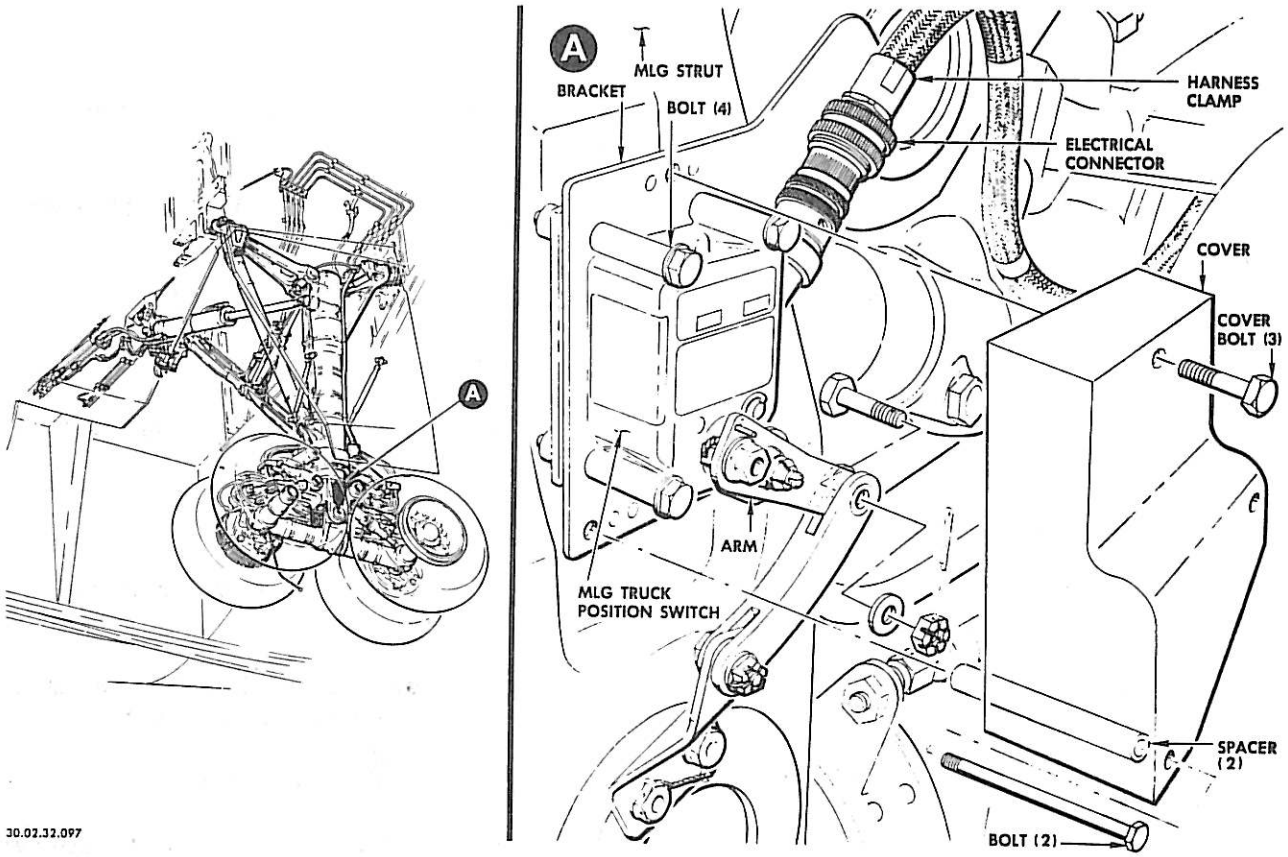
(4) Install clamp to secure electrical harness to switch support bracket.

(5) Adjust truck position switch (refer to 32-1-0, steps 2.C.(2) and 2.D.(5)).

(6) Position protective cover and spacers on switch support bracket and secure with three bolts.

(7) Remove warning tags and close circuit breakers opened in step B.

(8) Perform truck position switch operational check (refer to 32-0, steps 2.C.(10), 2.D.(3) (for applicable MLG), 2.I.(3), and 2.I.(5)).






Main Landing Gear Truck Position Switch Installation
Figure 201

## MAIN LANDING GEAR (MLG) DOWN-LOCK SWITCHES - MAINTENANCE PRACTICES

1. Removal/Installation MLG Down-Lock Switch (see Figure 201)

A. Equipment Required - None.

B. Preparation. Open and attach warning tags to the following circuit breakers, on main circuit breaker panel:

LANDING GEAR POS & WARN.

WARN HORN.

ANTI-SKID CONT and WARN (Applicable to RH MLG down-lock switch removal/installation only).

C. Remove MLG Down-Lock Switch.

(1) Loosen support clamp securing electrical harness to MLG jury brace.

(2) Disconnect electrical harness at quick disconnect on switch.

(3) Cut safety wire and remove hex nut that secures switch to MLG jury brace; remove switch.

D. Install MLG Down-Lock Switch.

(1) Install down-lock switch on MLG jury brace.

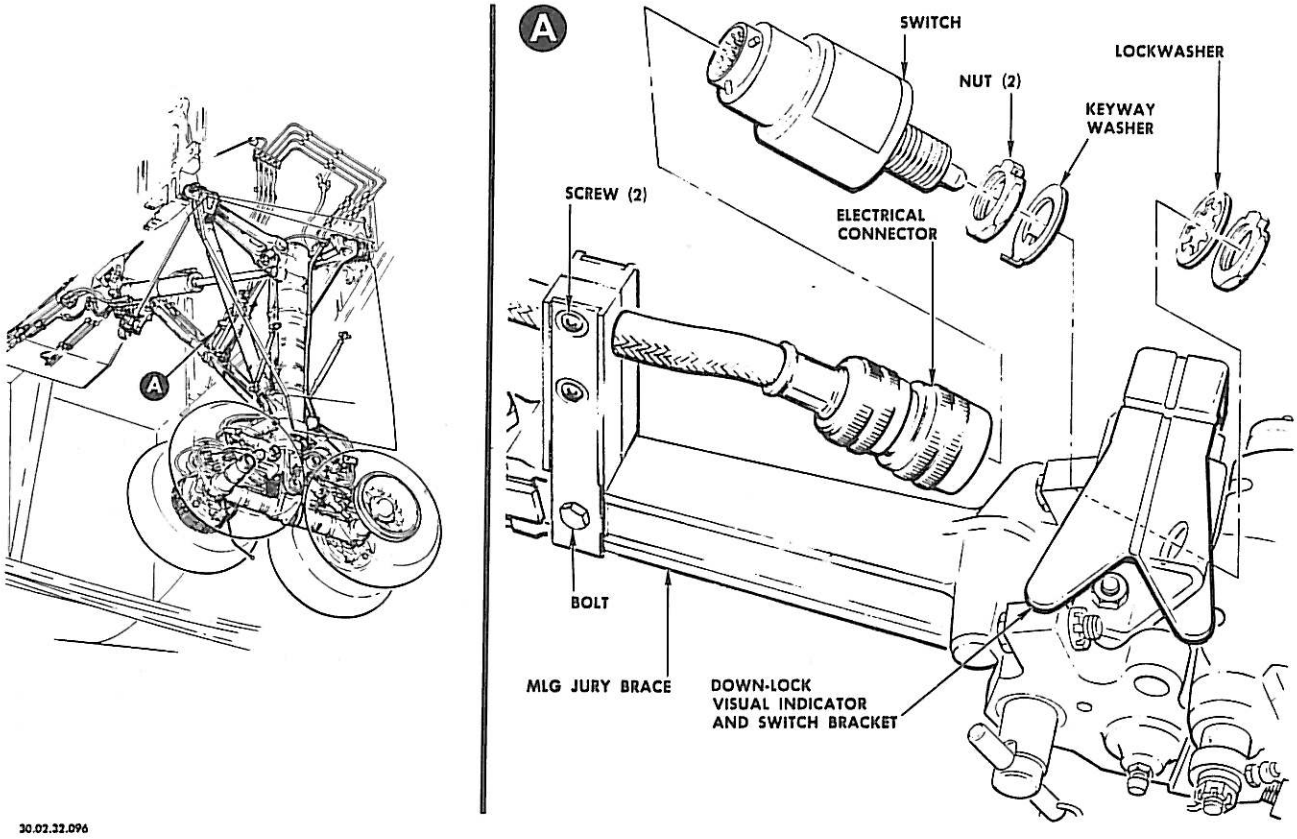
(2) Connect electrical harness to switch at quick disconnect.

(3) Tighten support clamp securing electrical harness to MLG jury brace.

(4) Adjust MLG down-lock switch (refer to 32-1-0, steps 2.C.(2) and 2.D.(4)). Safety-wire hex nuts after adjustment.

(5) Remove warning tags and close circuit breakers opened in step B.

(6) Perform landing gear operational check (refer to 32-0, steps 2.C.(4) thru 2.C.(13), 2.D.(5) thru 2.D.(5)(d) 9), 2.D.(6)(b) thru 2.D.(6)(c) 5) (excluding control lever force checks), 2.I.(1), and 2.I.(3) thru 2.I.(5)).






Main Landing Gear Down-Lock Switch Installation
Figure 201

## MAIN LANDING GEAR (MLG) UP-LOCK SWITCHES - MAINTENANCE PRACTICES

1. Removal/Installation MLG Up-Lock Switch (see Figure 201)

   A. Equipment Required - None.

   B. Preparation. Open and attach warning tag to the LANDING GEAR POS & WARN circuit breaker, on main circuit breaker panel.

   C. Remove MLG Up-Lock Switch.

      (1) Disconnect electrical harness at quick disconnect on switch.

      (2) Cut safety wire and remove hex nut that secures up-lock switch to support bracket on MLG up-lock assembly; remove switch.

   D. Install MLG Up-Lock Switch.

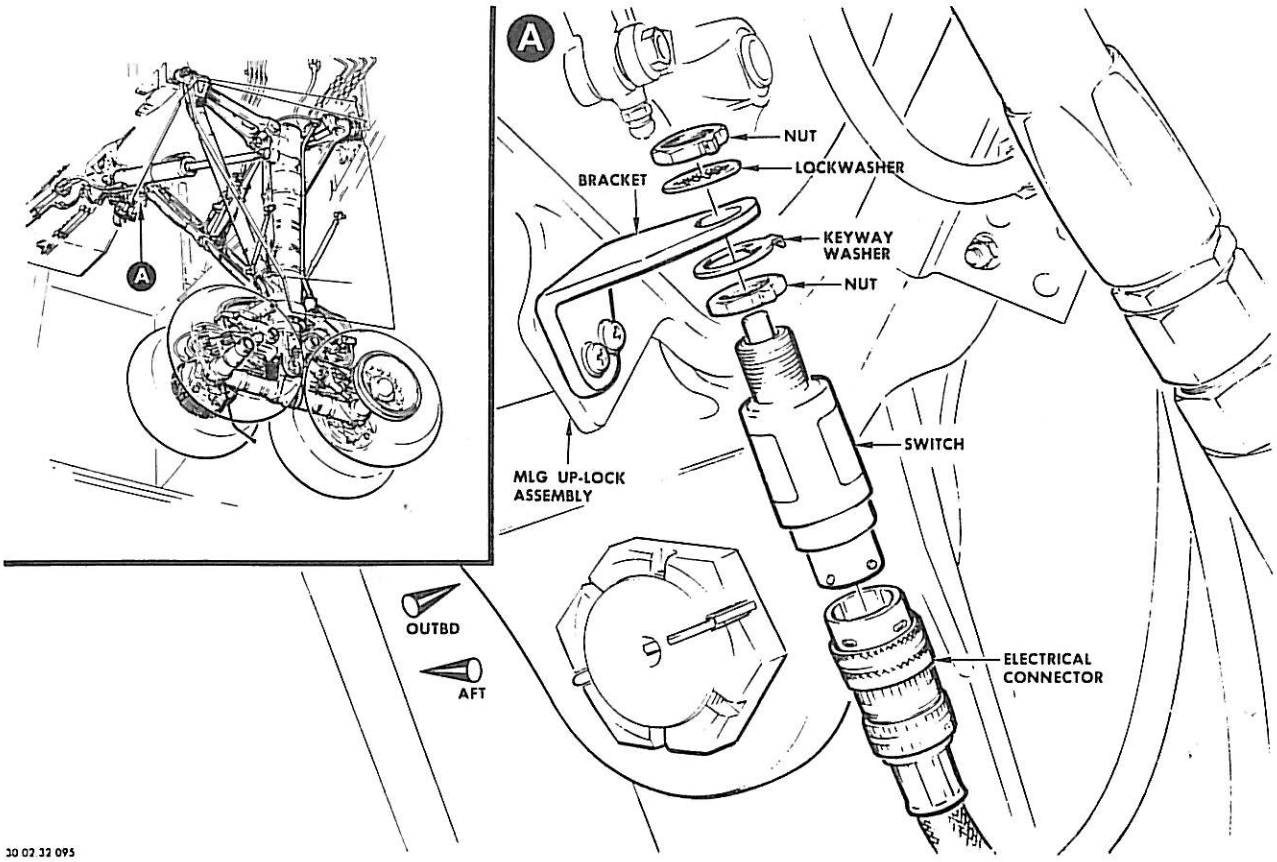
      (1) Install up-lock switch in support bracket on MLG up-lock assembly.

      (2) Connect electrical harness to switch at quick disconnect.

      (3) Adjust MLG up-lock switch (refer to 32-1-0, steps 2.C.(2), 2.C.(4), 2.C.(6), 2.D.(11), 2.D.(15), 2.D.(16), and 2.D.(18)). Safety-wire hex nuts after adjustment.

      (4) Remove warning tag and close LANDING GEAR POS & WARN circuit breaker.

      (5) Perform landing gear operational check (refer to 32-0, steps 2.C.(4) thru 2.C.(13), 2.D.(5) thru 2.D.(5)(d) 9), 2.D.(6)(b) thru 2.D.(6)(c) 5) (excluding control lever force checks), 2.I.(1), and 2.I.(3) thru 2.I.(5)).






Main Landing Gear Up-Lock Switch Installation
Figure 201

## NOSE LANDING GEAR (NLG) DOWN-LOCK UP-LOCK SWITCH - MAINTENANCE PRACTICES

1. Removal/Installation NLG Down-Lock Up-Lock Switch (see Figure 201)

A. Equipment Required. Airplane nose jacking equipment.

B. Preparation.

(1) Jack airplane at fuselage jack point until nose wheels clear the ground (refer to Chapter 7, LIFTING AND SHORING).

(2) Open and attach warning tags to the following circuit breakers, on main circuit breaker panel.

LANDING GEAR POS & WARN.

WARN HORN.

ANTI-SKID NOSE POWER.

C. Remove NLG Down-Lock Up-Lock Switch.

(1) Release ground access latches and open NLG doors (refer to 32-14-0).

WARNING: WHEN OPERATING LATCH LEVERS, HOLD DOORS AND LOWER THEM SLOWLY TO PREVENT POSSIBLE INJURY TO PERSONNEL.

(2) Remove support clamp securing electrical harness to NLG jury brace.

(3) Disconnect electrical harness at quick disconnect on switch.

(4) Remove NLG ground safety pin and raise gear enough to gain access to hex nuts securing switch to NLG jury brace.

(5) Cut safety wire and remove hex nut that secures switch to NLG jury brace; remove switch.

D. Install NLG Down-Lock Up-Lock Switch.

(1) Install down-lock up-lock switch on NLG jury brace.

(2) Connect electrical harness to switch at quick disconnect.

(3) Install support clamp securing electrical harness to NLG jury brace.

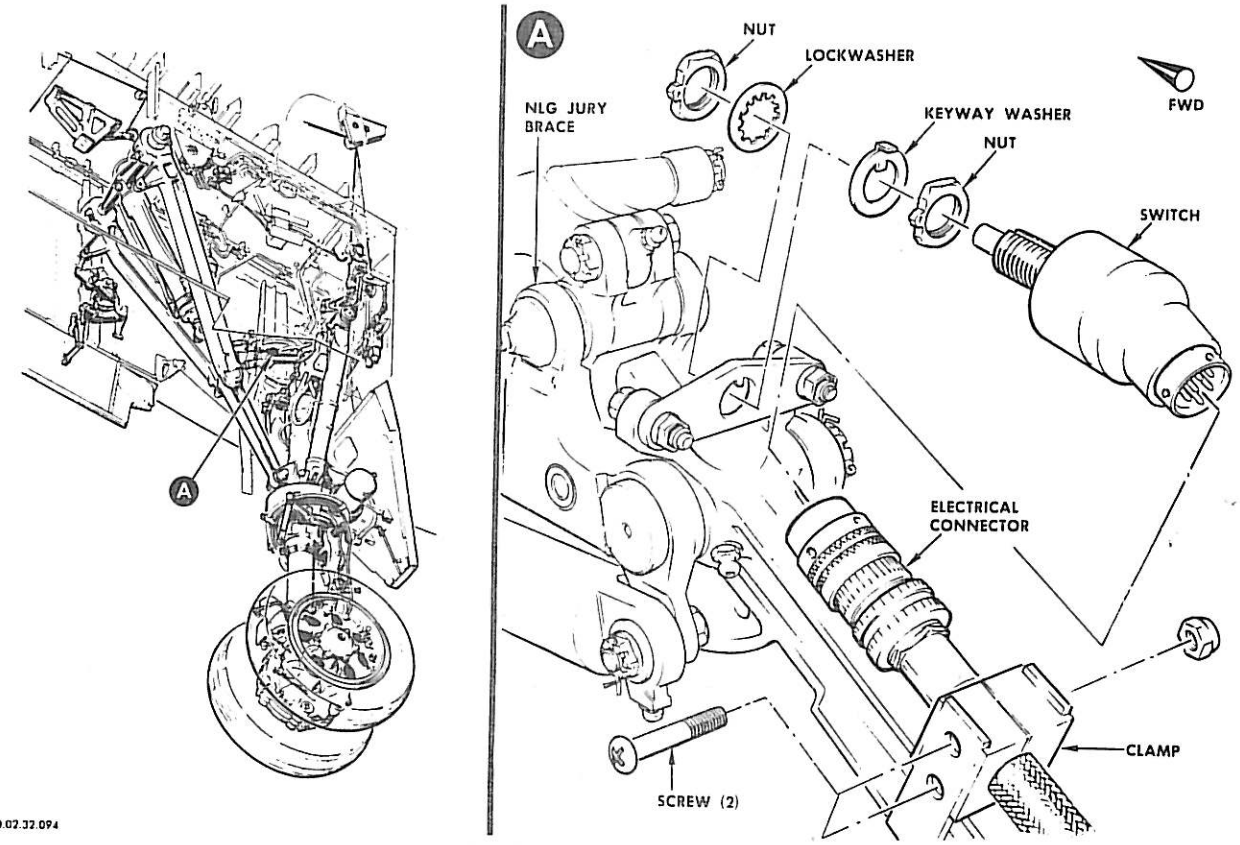
(4) Adjust NLG down-lock up-lock switch (refer to 32-3-0, step 2.D. (8)). Safety-wire hex nuts after adjustment.

(5) Remove warning tags and close circuit breakers opened in step B.

(6) Close NLG doors and secure ground access latches (refer to 32-14-0).

(7) Perform landing gear operational check (refer to 32-0, steps 2.C.(4) thru 2.C.(13), 2.D.(5) thru 2.D.(5)(d) 9), 2.D.(6)(b) thru 2.D.(6)(c) 5) (excluding control lever force checks), 2.I.(1), and 2.I.(3) thru 2.I.(5)).

(8) Deleted.




Nose Landing Gear Down-Lock Up-Lock Switch Installation
Figure 201

## NOSE LANDING GEAR (NLG) STOWED SWITCH - MAINTENANCE PRACTICES

1. Removal/Installation NLG Stowed Switch (see Figure 201)

   A. Equipment Required - None.

   B. Preparation. Open and attach warning tags to the following circuit breakers, on main circuit breaker panel.

      LANDING GEAR POS & WARN.

      WARN HORN.

      ANTI-SKID NOSE POWER.

   C. Remove NLG Stowed Switch.

      (1) Disconnect electrical harness at quick disconnect on switch.

      (2) Cut safety wire and loosen hex nut that secures switch to support bracket; remove switch.

   D. Install NLG Stowed Switch.

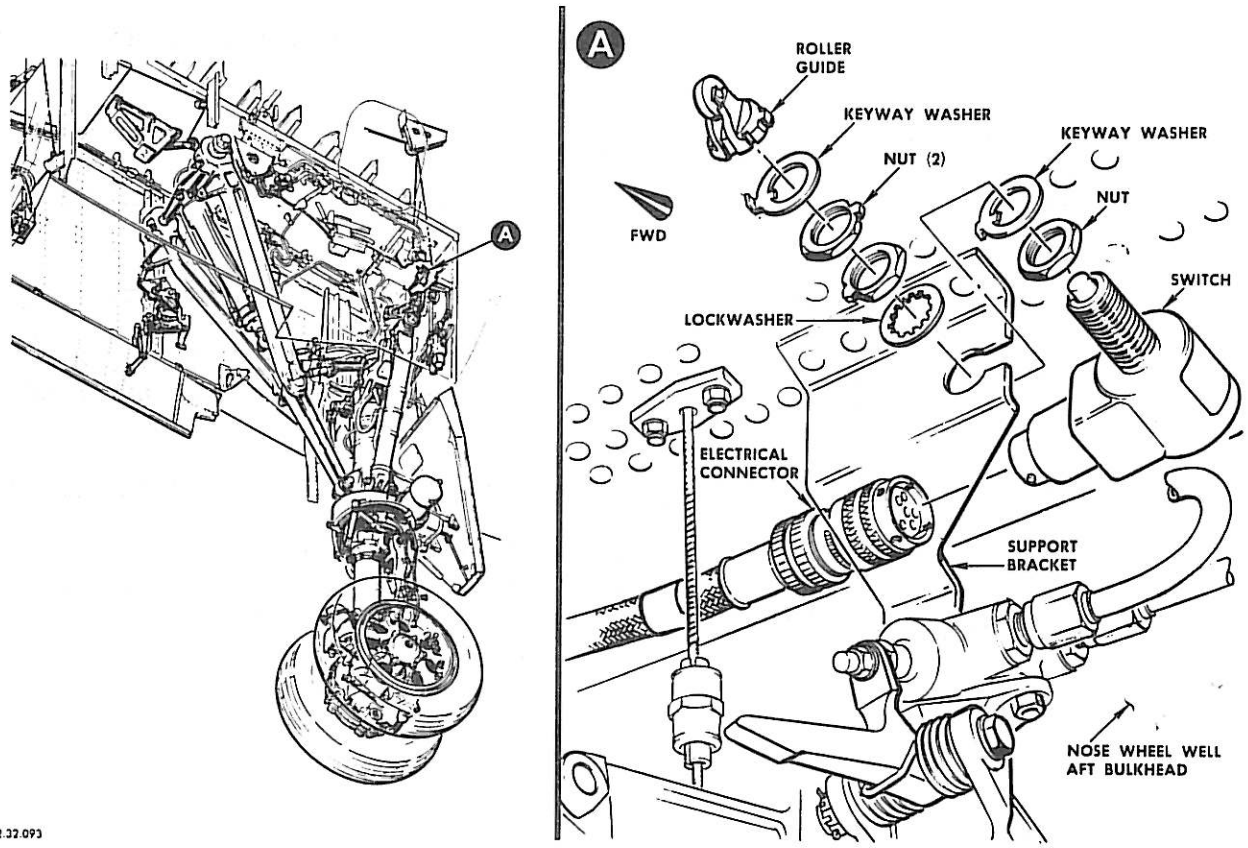
      (1) Install NLG stowed switch in support bracket on aft bulkhead of the nose wheel well.

      (2) Connect electrical harness to switch at quick disconnect.

      (3) Adjust NLG stowed switch (refer to 32-3-0, steps 2.C.(1), 2.C.(4), 2.D.(9)(d), and 2.D.(12)). Safety-wire hex nuts after adjustment.

      (4) Remove warning tags and close circuit breakers opened in step B.

      (5) Perform landing gear operational check (refer to 32-0, steps 2.C.(4) thru 2.C.(13), 2.D.(5) thru 2.D.(5)(d) 9), 2.D.(6)(b) thru 2.D.(6)(c) 5) (excluding control lever force checks), 2.I.(1), and 2.I.(3) thru 2.I.(5)).






Nose Landing Gear Stowed Switch Installation
Figure 201

## MAIN LANDING GEAR (MLG) DOOR FORWARD CLOSED-AND-LOCKED SWITCHES - MAINTENANCE PRACTICES

1. Removal/Installation MLG Door Forward Closed-and-Locked Switch (see Figure 201)

A. Equipment Required - None.

B. Preparation.

(1) Reduce hydraulic pressure to 0 psig (refer to Chapter 12, SERVICING).

(2) Open and attach warning tag to LANDING GEAR POS & WARN circuit breaker, on main circuit breaker panel.

C. Remove Door Forward Closed-and-Locked Switch.

(1) Operate main wheel well ground access handle in hydraulic compartment to release MLG door up-locks; manually open doors.

(2) Disconnect electrical harness at quick disconnect on switch.

(3) Cut safety wire and remove hex nut that secures switch to door up-lock; remove switch.

D. Install Door Forward Closed-and-Locked Switch.

(1) Install door forward closed-and-locked switch on MLG door forward up-lock.

(2) Connect electrical harness to switch at quick disconnect.

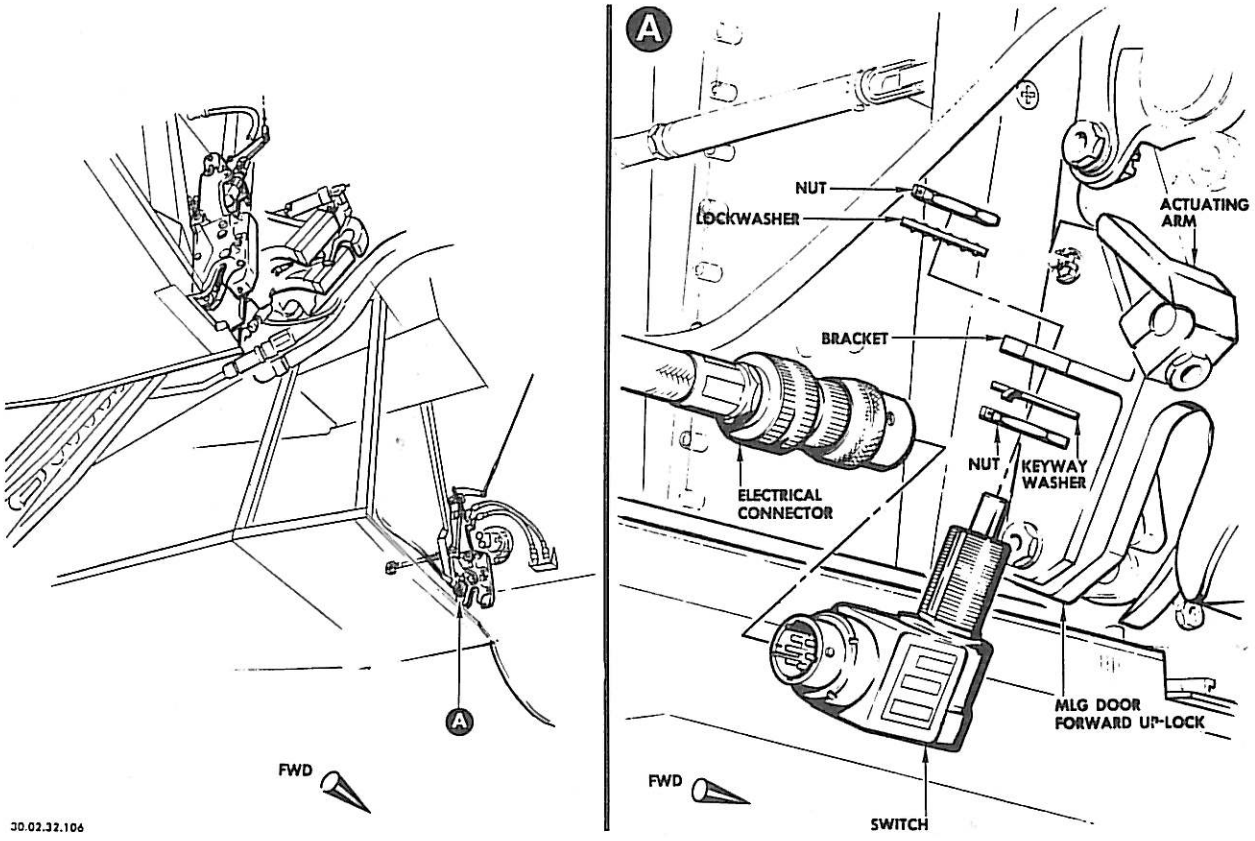
(3) Adjust MLG door forward closed-and-locked switch (refer to 32-13-0, step 1.C.(12)). Safety-wire hex nuts after adjustment.

(4) Remove warning tag and close LANDING GEAR POS & WARN circuit breaker.

(5) Pressurize No. 2 hydraulic system (refer to Chapter 29, HYDRAULIC POWER).

(6) Manually close MLG doors and return ground access handle to the door closed (forward) position.

(7) Perform landing gear operational check (refer to 32-0, steps 2.C.(4) thru 2.C.(13), 2.D.(5) thru 2.D.(5)(d) 9), 2.D.(6)(b) thru 2.D.(6)(c) 5) (excluding control lever force checks), 2.I.(1), and 2.I.(3) thru 2.I.(5)).




Main Landing Gear Door Forward Closed-and-Locked Switch Installation
Figure 201

## MAIN LANDING GEAR (MLG) DOOR AFT CLOSED-AND-LOCKED SWITCHES - MAINTENANCE PRACTICES

1. Removal/Installation MLG Door Aft Closed-and-Locked Switch (see Figure 201)

   A. Equipment Required - None.

   B. Preparation.

      (1) Reduce hydraulic pressure to 0 psig (refer to Chapter 12, SERVICING).

      (2) Open and attach warning tag to LANDING GEAR POS & WARN circuit breaker, on main circuit breaker panel.

   C. Remove Door Aft Closed-and-Locked Switch.

      (1) Operate main wheel well ground access handle in hydraulic compartment to release MLG door up-locks; manually open doors.

      (2) Disconnect electrical harness at quick disconnect on switch.

      (3) Cut safety wire and remove hex nut that secures switch to edge of main wheel well; remove switch.

   D. Install Door Aft Closed-and-Locked Switch.

      (1) Install door aft closed-and-locked switch in wing structure at edge of main wheel well.

      (2) Connect electrical harness to switch at quick disconnect.

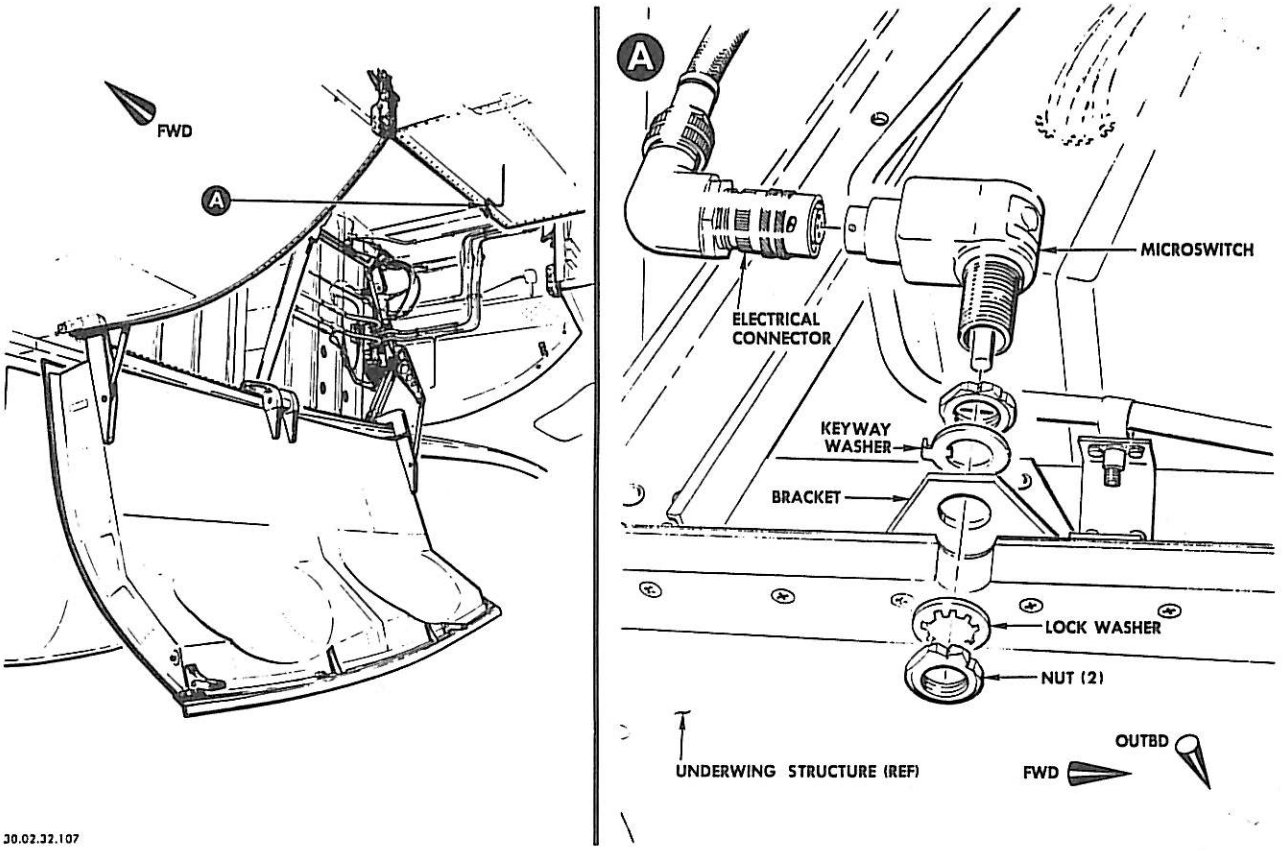
      (3) Adjust MLG door aft closed-and-locked switch (refer to 32-13-0, step 1.C.(12). Safety-wire hex nuts after adjustment.

      (4) Remove warning tag and close LANDING GEAR POS & WARN circuit breaker.

      (5) Pressurize No. 2 hydraulic system (refer to Chapter 29, HYDRAULIC POWER).

      (6) Manually close MLG doors and return ground access handle to the door closed (forward) position.

      (7) Perform landing gear operational check (refer to 32-0, steps 2.C.(4) thru 2.C.(13), 2.D.(5) thru 2.D.(5)(d) 9), 2.D.(6)(b) thru 2.D.(6)(c) 5) (excluding control lever force checks), 2.I.(1), and 2.I.(3) thru 2.I.(5)).




Main Landing Gear Door Aft Closed-and-Locked
Switch Installation
Figure 201

## NOSE LANDING GEAR (NLG) DOOR UP-LOCK SWITCH - MAINTENANCE PRACTICES

1. Removal/Installation Nose Landing Gear Door Up-Lock Switch (see Figure 201)

   A. Equipment Required - None.

   B. Preparation. Open and attach warning tag to the LANDING GEAR POS & WARN circuit breaker, on main circuit breaker panel.

   C. Remove NLG Door Up-Lock Switch.

      (1) Release ground access latches and open NLG doors (refer to 32-14-0).

      WARNING: WHEN OPERATING LATCH LEVERS, HOLD DOORS AND LOWER THEM SLOWLY TO PREVENT POSSIBLE INJURY TO PERSONNEL.

      (2) Disconnect electrical harness at quick disconnect on switch.

      (3) Cut safety wire and remove hex nut securing switch to NLG door up-lock; remove switch.

   D. Install NLG Door Up-Lock Switch.

      (1) Install switch on NLG door up-lock.

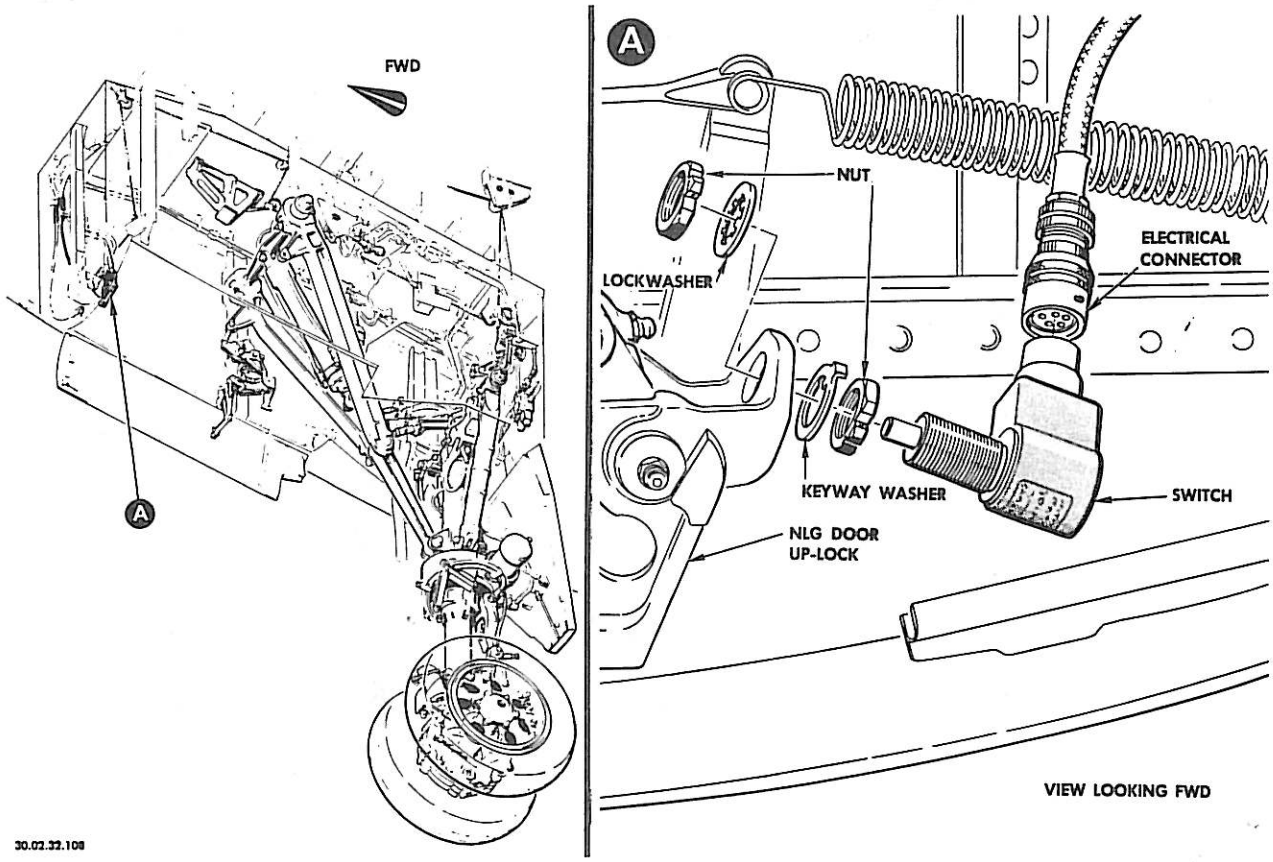
      (2) Connect electrical harness to switch at quick disconnect.

      (3) Adjust NLG door up-lock switch (refer to 32-3-0, step 2.D.(13)(1)). Safety-wire hex nuts after adjustment.

      (4) Remove warning tag and close LANDING GEAR POS & WARN circuit breaker.

      (5) Close NLG doors and secure ground access latches (refer to 32-14-0).

      (6) Perform landing gear operational check (refer to 32-0, steps 2.C.(4) thru 2.C.(13), 2.D.(5) thru 2.D.(5)(d) 9), 2.D.(6)(b) thru 2.D.(6)(c) 5) (excluding control lever force checks), 2.I.(1), and 2.I.(3) thru 2.I.(5)).




Nose Landing Gear Door Up-Lock Switch Installation
Figure 201

## NOSE LANDING GEAR (NLG) DOOR CLOSED SWITCHES - MAINTENANCE PRACTICES

1. Removal/Installation NLG Door Closed Switch (see Figure 201)

A. Equipment Required - None.

B. Preparation. Open and attach warning tag to the LANDING GEAR POS & WARN circuit breaker, on main circuit breaker panel.

C. Remove NLG Door Closed Switch.

(1) Release ground access latches and open NLG doors (refer to 32-14-0).

WARNING: WHEN OPERATING LATCH LEVERS, HOLD DOORS AND LOWER THEM SLOWLY TO PREVENT POSSIBLE INJURY TO PERSONNEL.

(2) Disconnect electrical harness at quick disconnect on switch.

(3) Cut safety wire and remove hex nut securing switch to bracket; remove switch.

D. Install NLG Door Closed Switch.

(1) Install switch in bracket on forward bulkhead of nose wheel well.

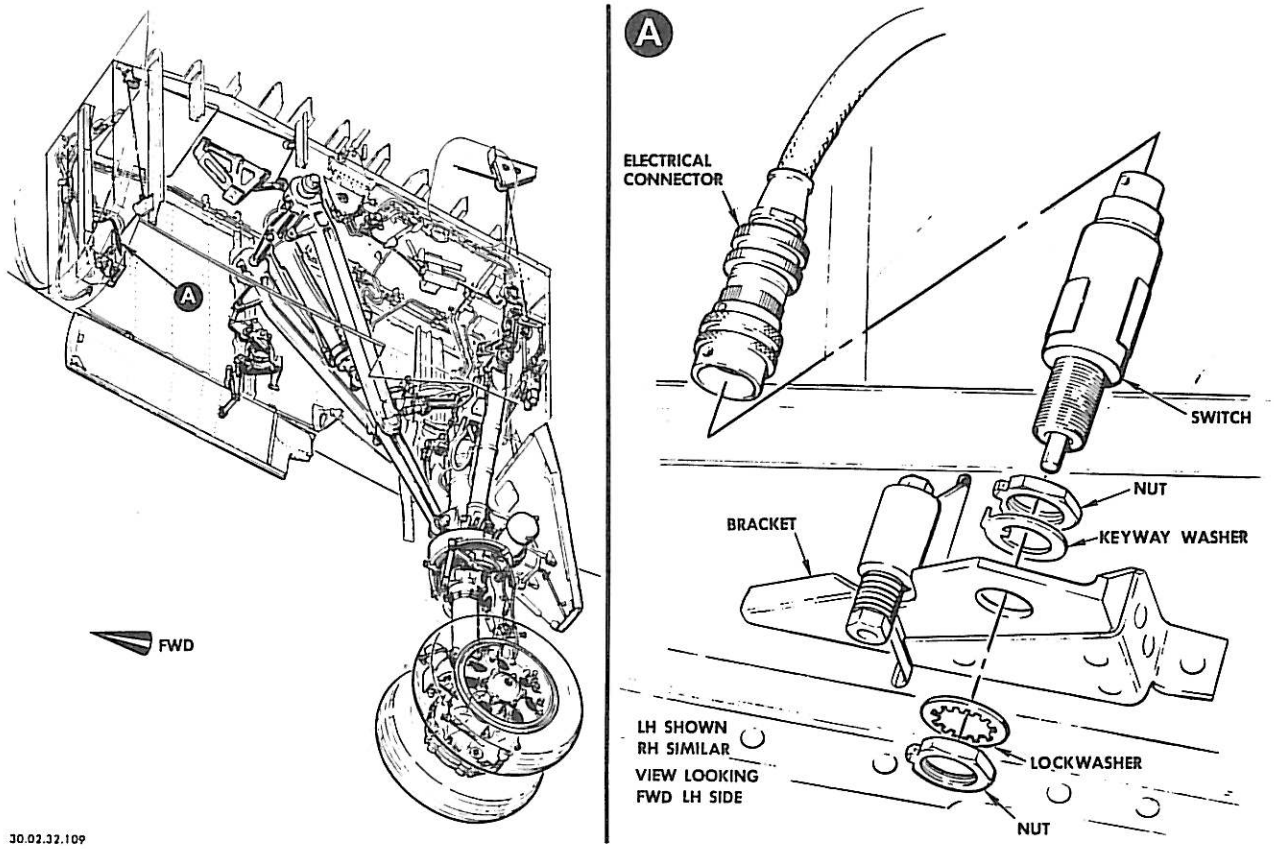
(2) Connect electrical harness to switch at quick disconnect.

(3) Adjust NLG door closed switch (refer to 32-3-0, step 2.D.(13)(m)). Safety-wire hex nuts after adjustment.

(4) Remove warning tag and close LANDING GEAR POS & WARN circuit breaker.

(5) Close NLG doors and secure ground access latches (refer to 32-14-0).

(6) Perform landing gear operational check (refer to 32-0, steps 2.C.(4) thru 2.C.(13), 2.D.(5) thru 2.D.(5)(d) 9), 2.D.(6)(b) thru 2.D.(6)(c) 5) (excluding control lever force checks), 2.I. (1), and 2.I. (3) thru 2.I.(5)).




Nose Landing Gear Door Closed Switch
Installation
Figure 201

## MAIN LANDING GEAR (MLG) SEQUENCE VALVE SENSOR SWITCHES - MAINTENANCE PRACTICES

1. Removal/Installation MLG Sequence Valve Sensor Switch (see 32-13-0, Figure 1 for location)

   A. Equipment Required - None.

   B. Preparation.

      (1) Reduce hydraulic pressure to 0 psig (refer to Chapter 12, SERVICING).

      (2) Open and attach warning tags to the following circuit breakers, on main circuit breaker panel:

      LANDING GEAR POS & WARN.

      LANDING GEAR HANDLE SOLENOID.

      HYD PUMP MOTOR CONT.

   C. Remove MLG Sequence Valve Sensor Switch.

      (1) Operate main wheel well ground access handle in hydraulic compartment to release MLG door up-locks; manually open doors.

      (2) Disconnect electrical harness at quick disconnect on switch.

      (3) Disconnect hydraulic line at sensor switch.

      (4) Remove two mounting bolts which secure sensor switch to mounting bracket on interwell web; remove switch.

      NOTE: Remove union from port of sensor switch and hold for installation on replacement sensor switch; discard "O" ring.

   D. Install MLG Sequence Valve Sensor Switch.

      (1) Install union in port of replacement sensor switch. Use new "O" ring for installation. ("O" ring must be soaked in Skydrol 500A hydraulic fluid prior to installation.)

      (2) Position sensor switch on mounting bracket with electrical receptacle facing down; secure to bracket with two mounting bolts.

      (3) Connect hydraulic line to sensor switch.

      (4) Connect electrical harness to switch at quick disconnect.

      (5) Remove warning tags and close circuit breakers opened in step B.(2).

(6) Pressurize No. 2 hydraulic system (refer to Chapter 29, HYDRAULIC POWER).

(7) Manually close MLG doors and return ground access handle to the door closed (forward) position.

(8) Perform Adjustment/Test Landing Gear System - Operation Check (refer to 32-0). Check switch installation for hydraulic leaks.

NOTE: If only the MLG sequence valve sensor switch has been replaced and no other rigging or adjustment has been changed, operation can be checked per 32-0, steps 2.C.(4) thru 2.C.(13), 2.D.(5) thru 2.D.(5)(d)9) (excluding control lever force check), 2.D.(6)(b) thru 2.D.(6)(c)5) and 2.I.(1) thru 2.I.(5).

# LANDING GEAR GROUND SAFETY SYSTEM - DESCRIPTION AND OPERATION

## 1. General

A landing gear ground safety switch is installed on the right side (looking forward) of the MLG junction box on each MLG shock strut. The switch is actuated by a cam on the MLG aft torque arm when shock strut is compressed. When the ground safety switches are actuated, power is received from the 28-volt dc emergency bus through the LH and RH LANDING GEAR GRD SAFETY RELAYS circuit breakers to energize *nine, or **eleven, ground safety system relays. The system relays include the No. 1 through No. 4 right-hand and No. 1 through No. 5 left-hand landing gear ground safety relays located on the sta 306 relay panel in the electrical and electronic compartment, and **two air conditioning ground safety relays located in the right-hand air conditioning compartment. See Figure 1 for a schematic illustration of the landing gear ground safety system.

The ground safety system relays control the following electrical circuits:

Temperature Equalizer Control (refer to Chapter 21)

Inboard-Outboard Spoiler Control (refer to Chapter 27)

Antiskid Control (refer to 32-8-0)

Autopilot (refer to Chapter 22)

Engine Ground Cooling (refer to Chapter 72)

Cabin Air Conditioning (refer to Chapter 21)

Bleed Air Duct Isolation (refer to Chapter 36)

Tail Anti-Ice (refer to Chapter 30)

Landing Gear Position and Warning (refer to 32-10-0)

Electrical Compartment Cooling Fan (refer to Chapter 21)

In addition, the MLG ground safety switches control the following electrical circuits:

Cabin Pressurization (refer to Chapter 21)

Landing Gear Control (refer to 32-5-0 and 32-12-0)

Warning Horn (refer to 32-12-0)

* Applicable to airplanes with electric freon package air conditioning system.
** Applicable to airplanes with pneumatic freon package air conditioning system.

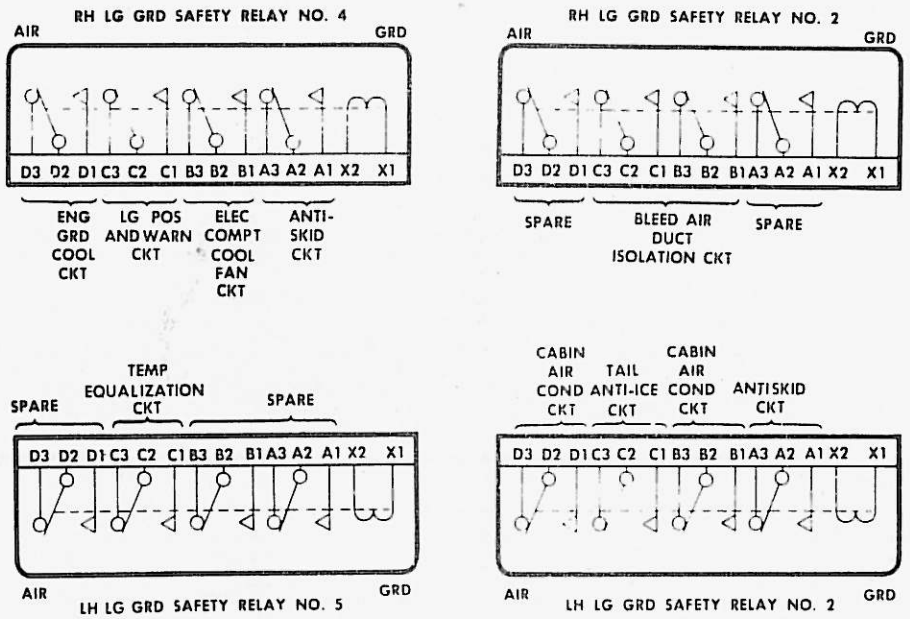
TEMPORARY REVISION No. 32-67.

Insert facing 32-11-0, Page 3, dated Jan. 25/63 (or subsequent).

The schematic on noted facing page is applicable to all airplanes except as follows: for airplanes not modified per Service Bulletin No. 32-37, substitute the following information where indicated.

Retain this temporary revision in your manual until all applicable airplanes have been modified per noted service bulletin.

Substitute the relays illustrated below in place of respective relays on noted facing page.

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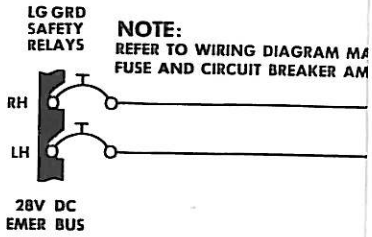
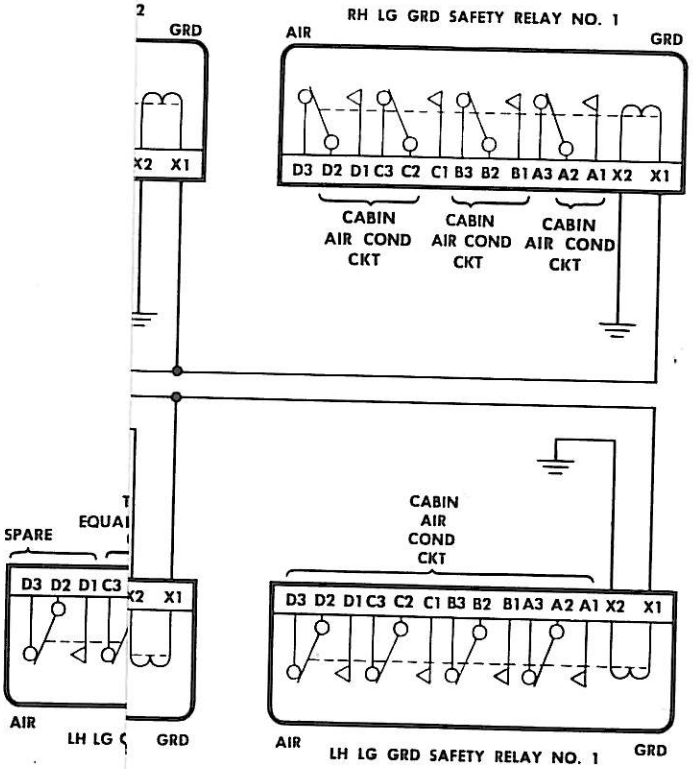



**NOTE:**
REFER TO WIRING DIAGRAM MA
FUSE AND CIRCUIT BREAKER AM

| EFFECTIVITY | |
|---|---|
| APPLICABLE TO AIRPLANES | |
| | WITH ELECTRIC FREON PACKAGE AIR CONDITIONING SYSTEM |

ITH AIRPLANE
AND ELECTRICAL

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re 1 (Sheet 1 of 2)

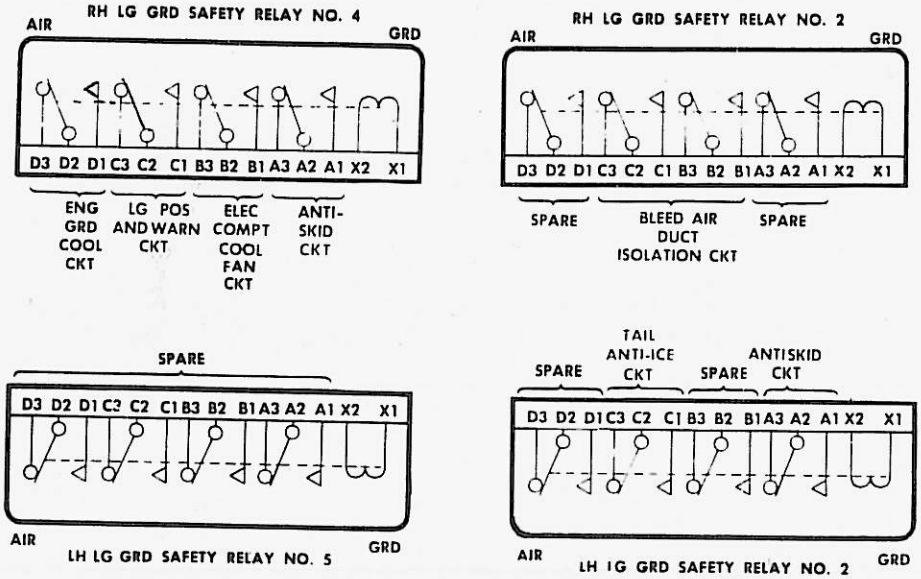
TEMPORARY REVISION NO. 32-68.

Insert facing 32-11-0, Page 5, dated Jan. 25/63 (or subsequent).

The schematic on noted facing page is applicable to all airplanes except as follows: for airplanes not modified per Service Bulletin No. 32-37, substitute the following information where indicated.

Retain this temporary revision in your manual until all applicable airplanes have been modified per noted service bulletin.

Substitute the relays illustrated below in place of repsective relays on noted facing page.

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LDG GEAR GRD SAFETY RELAYS

RH

LH

28V DC EMER BUS

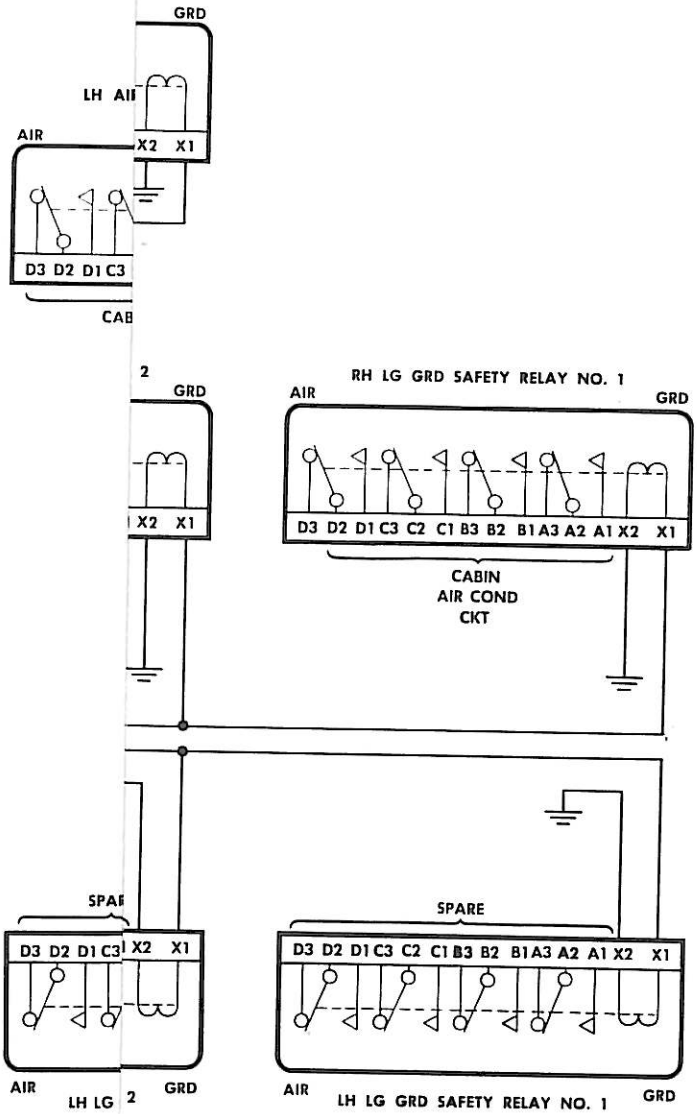
**NOTE:**

REFER TO WIRING DIAGRAM M
FUSE AND CIRCUIT BREAKER A

| EFFECTIVITY |
| --- |
| APPLICABLE TO AIRPLANES |
| WITH PNEUMATIC FREON PACKAGE AIR CONDITIONING SYSTEM |

**CONDITION**

CIRCUIT SHOWN WITH AIRPLANE ON THE GROUND AND ELECTRICAL POWER OFF.

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und Safety System - Schematic
ure 1 (Sheet 2 of 2)

## MAIN LANDING GEAR (MLG) GROUND SAFETY SWITCHES - MAINTENANCE PRACTICES

1. Removal/Installation MLG Ground Safety Switch (see Figure 201)

A. Equipment Required - None.

B. Preparation.

(1) Open and attach warning tags to the following circuit breakers, on main circuit breaker panel:

RH and LH LANDING GEAR GRD SAFETY RELAYS.

LANDING GEAR HANDLE SOLENOID.

FWD and AFT CABIN PRESSURE REGULATOR.

(2) Remove landing gear override WARN HORN fuse in dc power and emergency bus distribution box, at main circuit breaker panel. Attach warning tag.

C. Remove MLG Ground Safety Switch

(1) Remove MLG pull box cover; identify and disconnect wires to the ground safety switch at terminals in box.

(2) Remove four bolts, washers, and nuts attaching switch protective cover to MLG pull box; remove cover.

(3) Remove hex nut, washer, and seal from inside MLG pull box which attach switch to box.

(4) Remove two bolts and nuts connecting switch support bracket to MLG pull box.

(5) Remove ground safety switch and support bracket. (Retain support bracket for installation.)

D. Install MLG Ground Safety Switch.

(1) Install support bracket between hex nuts on switch and adjust switch to approximate mounting position.

(2) Install switch and support bracket, seal, washer, and nut on side of MLG pull box.

(3) Connect correct wires together at terminals in MLG pull box, as identified in step C.(1).

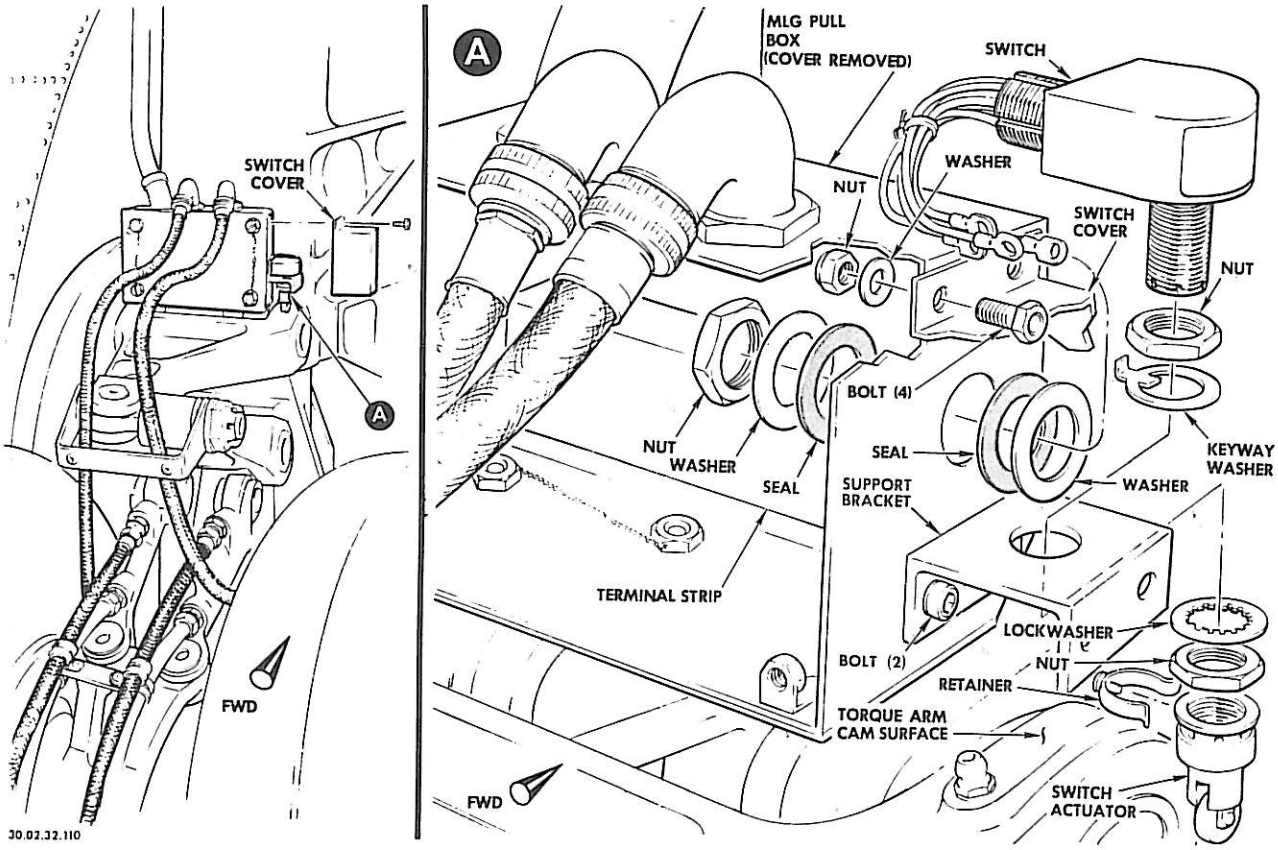
(4) Adjust ground safety switch (refer to 32-1-0, steps 2.C.(2) and 2.D.(6). Safety-wire switch hex nuts after adjustment.

(5) Install switch protective cover on side of MLG pull box.

(6) Install MLG pull box cover and safety-wire cover attach bolts.

(7) Remove warning tags, close circuit breakers and install fuse removed in step B.

(8) Perform ground safety switch operational check (refer to 32-0, steps 2.C.(1), 2.C.(10), 2.D.(4), 2. I.(3), and 2.I.(5)).




Main Landing Gear
Ground Safety Switch Installation
Figure 201

## LANDING GEAR GROUND SAFETY SYSTEM RELAYS - MAINTENANCE PRACTICES

1. Removal/Installation Landing Gear Ground Safety System Relays

A. Equipment Required - None.

B. Preparation. If electrical power is not removed from the airplane, open and attach warning tags to applicable circuit breakers.

C. Remove Relay.

(1) Gain access to relay to be replaced.

NOTE: The LH and RH landing gear ground safety relays are on the station 306 relay panel, to the right and aft of the electrical and electronic compartment door. *The air conditioning ground safety relays are in the right-hand air conditioning compartment. Gain access through the refrigeration package access doors.

(2) Remove mounting screws and lockwashers securing relay.

(3) Remove relay.

D. Install Relay.

(1) Align relay locating pin(s) with socket and insert relay into socket.

(2) Install mounting screws and lockwashers.

(3) Remove warning tag and close circuit breakers opened in step B, and check relay operation.

*Applicable to airplanes with pneumatic freon package air conditioning system only.

# WARNING HORN SYSTEM - DESCRIPTION AND OPERATION

## 1. General

A warning horn in the flight compartment alerts the flight crew when the landing gear, wing flaps, or horizontal stabilizer are not positioned or trimmed properly for takeoff and landing approach. The system also warns the crew if the power control levers are advanced with the spoiler speed brake handle out of the retracted position detent, or if cabin altitude exceeds 10,000 feet. This system, shown on Figure 1, includes switches, relays, position transmitters, a cycle timer, and the necessary wires to route signals to the warning horn.

A. Landing Gear Warning Horn System - Groundborne Operation.

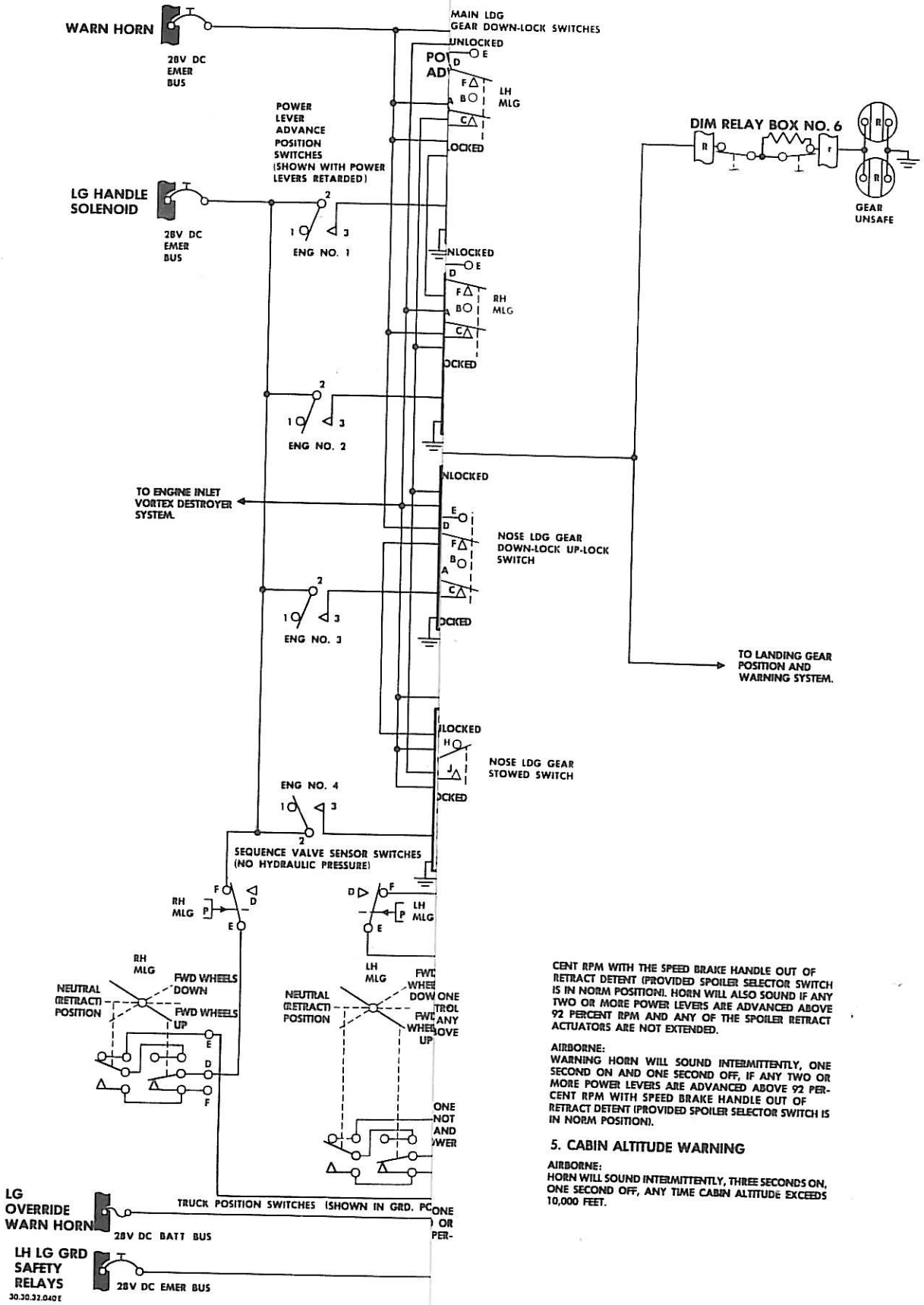
When the airplane is groundborne, the warning horn will sound continuously if the landing gear control lever is not mechanically locked in the DOWN position. Actuating the LG O'RIDE lever closes the contacts of the control lever lock solenoid switch and completes a circuit from the 28-volt dc battery bus through the landing gear override WARN HORN fuse, the power lever advance diode, and the closed left MLG ground safety switch to the horn, causing the horn to sound continuously.

B. Landing Gear Warning Horn System - Airborne Operation.

When the airplane is airborne, the warning horn will sound continuously if one or more power levers are retarded below 75 percent rpm with one or more of the landing gears not down and locked. Retarding one or more of the power control levers below 75 percent rpm without all of the landing gear units down and locked completes a circuit from the 28-volt dc emergency bus through the WARN HORN circuit breaker, power lever retard switches and relays, and one or more of the landing gear down-and-locked switches to the warning horn, causing the horn to sound continuously.

If the horn sounds because of reduced power setting, the pilot can silence the horn by momentarily depressing the WARN HORN CUTOFF switch on the pilots' pedestal.

For additional information regarding the cabin altitude and the flight control warning horn systems, or the power lever advance/retard switches and relays, refer to Chapter 21, AIR CONDITIONING, Chapter 27, FLIGHT CONTROL, and Chapter 76, ENGINE CONTROLS, respectively.




CENT RPM WITH THE SPEED BRAKE HANDLE OUT OF RETRACT DETENT (PROVIDED SPOILER SELECTOR SWITCH IS IN NORM POSITION). HORN WILL ALSO SOUND IF ANY TWO OR MORE POWER LEVERS ARE ADVANCED ABOVE 92 PERCENT RPM AND ANY OF THE SPOILER RETRACT ACTUATORS ARE NOT EXTENDED.

AIRBORNE:
WARNING HORN WILL SOUND INTERMITTENTLY, ONE SECOND ON AND ONE SECOND OFF, IF ANY TWO OR MORE POWER LEVERS ARE ADVANCED ABOVE 92 PERCENT RPM WITH SPEED BRAKE HANDLE OUT OF RETRACT DETENT (PROVIDED SPOILER SELECTOR SWITCH IS IN NORM POSITION).

### 5. CABIN ALTITUDE WARNING

AIRBORNE:
HORN WILL SOUND INTERMITTENTLY, THREE SECONDS ON, ONE SECOND OFF, ANY TIME CABIN ALTITUDE EXCEEDS 10,000 FEET.

## WARNING HORN SYSTEM - TROUBLE SHOOTING

| POSSIBLE CAUSE | ISOLATION PROCEDURE AND CORRECTION |
|---|---|
| **1. WARNING HORN DOES NOT SOUND WHEN "LG O'RIDE" LEVER IS ACTUATED AND AIRPLANE IS ON THE GROUND** | |
| A. Landing gear override WARN HORN fuse burned out. | Check for 28 volts dc power at both sides of fuse. If power is present at one side and not the other, replace fuse. If no power at either side, refer to Chapter 24, ELECTRICAL POWER. |
| B. Open circuit between landing gear override WARN HORN fuse and landing gear control lever lock solenoid switch. | Check for 28 volts dc power at lock solenoid switch. If no power, repair or replace wiring. |
| C. Landing gear control lever lock solenoid switch defective. | Actuate LG O'RIDE lever and check for 28 volts dc power at each side of lock solenoid switch. If no power at either side, repair or replace wiring between landing gear override WARN HORN fuse and lock solenoid switch. If power is present at one side and not the other, replace lock solenoid switch. |
| D. LH main landing gear ground safety switch out of adjustment, or defective. | Remove LH main landing gear pull box cover. Actuate LG O'RIDE lever and check for 28 volts dc power at LH main landing gear ground safety switch. If no power, repair or replace wiring between lock solenoid switch and LH main landing gear ground safety switch. If power is present at LH main landing gear ground safety switch, check for continuity through switch. If open circuit, check ground safety switch adjustment (refer to 32-1-0) and adjust as necessary. If switch adjustment is satisfactory, replace switch. |
| E. Defective warning horn. | Actuate LG O'RIDE lever and check for 28 volts dc power at warning horn power terminal. If power is present, connect jumper between ground terminal of horn and ground. If horn still does not sound, replace warning horn. |

| POSSIBLE CAUSE | ISOLATION PROCEDURE AND CORRECTION |
|---|---|
| 2. WARNING HORN DOES NOT SOUND WHEN ONE OR MORE OF THE ENGINE POWER CONTROL LEVERS ARE RETARDED BELOW 75 PERCENT RPM WITH THE AIRPLANE AIRBORNE AND ONE OR MORE LANDING GEAR UNITS NOT DOWN AND LOCKED | |
| A. Defective WARN HORN circuit breaker. | With WARN HORN circuit breaker closed, check for 28 volts dc power at both sides of circuit breaker. If power is present at one side and not the other, replace circuit breaker. If no power at either side, refer to Chapter 24, ELECTRICAL POWER. |
| B. Defective warning horn. | Actuate LG O'RIDE lever. If horn sounds, trouble is elsewhere. If horn does not sound, refer to paragraph 1.E. |
| C. Power lever retard switches out of adjustment or defective, or open circuit between WARN HORN circuit breaker and power lever retard relays. | Retard power levers and remove power lever retard relays. Check for 28 volts dc power at receptacle for each power lever retard relay. If power is present, trouble is elsewhere. If no power at all relay receptacles, an open circuit between the WARN HORN circuit breaker and power lever retard switches is indicated. Repair or replace wiring as necessary.<br><br>If no power is present at one or more of the relay receptacles, malfunctioning power lever retard switches, or open circuit between the power lever retard switch(es) and relay(s) is indicated. Check for continuity through power lever retard switch(es). If continuity, repair or replace wiring between power lever retard switch(es) and relay(s) as necessary. If no continuity, check power lever retard switch(es) adjustment (refer to Chapter 76, ENGINE CONTROLS) and adjust as necessary. If switch adjustment is satisfactory, replace switch(es). |
| D. Defective power lever retard relay(s), or open circuit between power lever retard relay(s) and NLG stowed switch and landing gear down-lock switches. | Remove power lever retard relay(s) and check for continuity through relay(s). If no continuity, replace relay(s). If continuity is obtained, check for continuity between relay receptacles and noted switches. |

| POSSIBLE CAUSE | ISOLATION PROCEDURE AND CORRECTION |
|---|---|
| | If no continuity, repair or replace wiring as necessary. |
| E. NLG stowed switch and/or landing gear down-lock switch(es) out of adjustment or defective, or open circuit between noted switches and warning horn. | Disconnect electrical plugs from noted switches and check for continuity between switch electrical plugs and warning horn. If no continuity, repair or replace wiring as necessary. If continuity is obtained, check adjustment of noted switches (refer to 32-1-0 and 32-3-0) and adjust as necessary. If adjustment is satisfactory, replace switch(es) as necessary. |
| F. Pilots' WARN HORN CUTOFF switch stuck in the closed position. | Check for continuity between receptacles of the power lever retard relays and ground. If circuit is complete, replace WARN HORN CUTOFF switch. |

3. WARNING HORN SOUNDS WHEN ENGINE POWER CONTROL LEVERS ARE RETARDED AND ALL LANDING GEAR UNITS ARE DOWN AND LOCKED

| | |
|---|---|
| A. NLG stowed switch and/or landing gear down-lock switch(es) out of adjustment or defective. | Disconnect electrical plugs from noted switches and check for continuity through switches. If no continuity, check switch adjustment (refer to 32-1-0 and 32-3-0) and adjust as necessary. If adjustment is satisfactory, replace switch(es) as necessary. |

## WARNING HORN - MAINTENANCE PRACTICES

1. Removal/Installation Warning Horn (see Figure 201)

   A. Equipment Required - None.

   B. Preparation. Open and attach warning tags to the following circuit breakers, on main circuit breaker panel:

      WARN HORN.

      LANDING GEAR HANDLE SOLENOID.

      CABIN ALT WARN.

   C. Remove Warning Horn.

      (1) Remove screws from aft center overhead panel in flight compartment and lower panel to gain access to warning horn. Support panel to take weight off of attached harnesses.

      (2) Identify and disconnect electrical leads from warning horn.

      (3) Remove screws attaching warning horn to support bracket; remove horn.

   D. Install Warning Horn.

      (1) Install warning horn on support bracket.

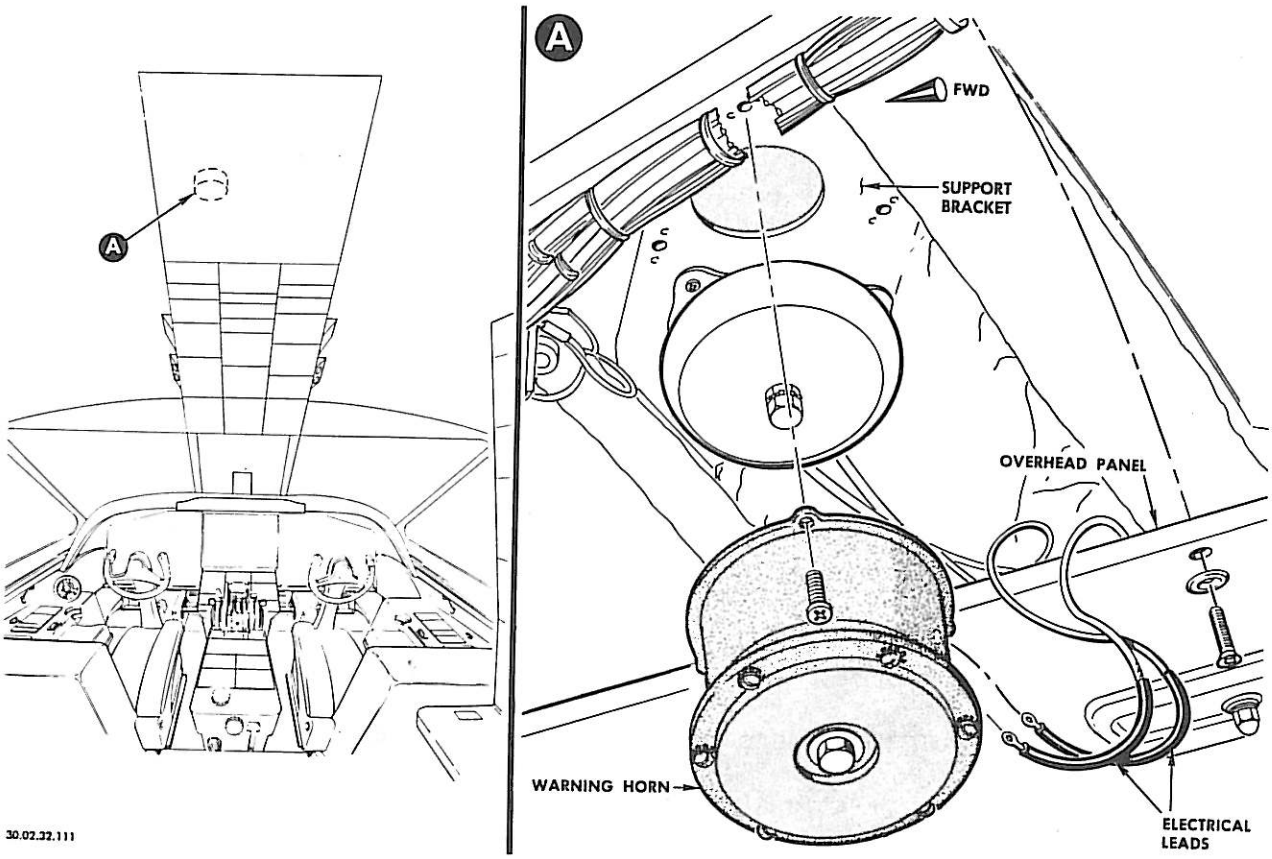
      (2) Connect electrical leads to warning horn, as identified in step C. (2).

      (3) Place overhead panel in position and secure with screws.

      (4) Remove warning tags and close circuit breakers opened in step B.

      (5) Perform operational check (refer to 32-0, steps 2.C.(1), 2.C.(10) thru 2.C.(12), 2.D.(4)(b) thru 2.D.(4)(e), and 2.I.(3)).

      (6) Deleted.


A
FWD
SUPPORT BRACKET
OVERHEAD PANEL
WARNING HORN
ELECTRICAL LEADS
30.02.32.111

# MAIN LANDING GEAR (MLG) DOORS - DESCRIPTION AND OPERATION

## 1. General

The left and right main landing gear wheel wells are enclosed by separate main landing gear doors and fairings. The doors are hinged at the inboard edge near the centerline of the airplane and swing outward and up to close. Each door is operated by two hydraulic actuating cylinders; see Figure 1. Two door up-locks in each main wheel well lock the doors in the closed position; see Figure 2.

The main landing gear fairings are hinged outboard and below the main landing gear trunnion and attach directly to and extend or retract with the main landing gear shock strut.

## 2. Operation

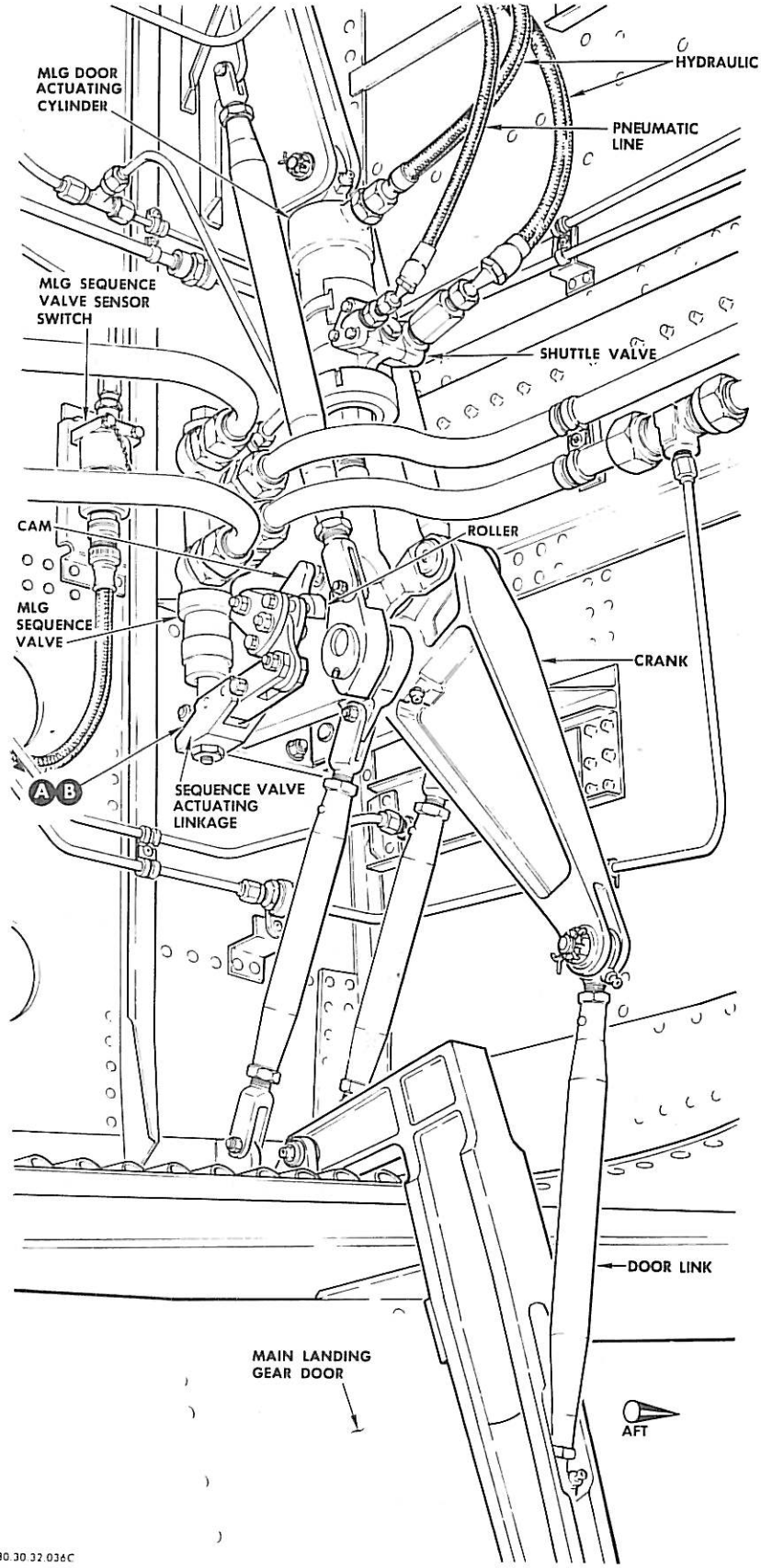
The main landing gear door operating sequence is controlled by the main landing gear hydraulic system. The doors are sequenced to close when the main landing gear is either fully extended or retracted, and open anytime the gear is in transit. Opening and closing of the main landing gear doors is accomplished by a forward and aft hydraulic actuating cylinder for each door.

During normal gear retraction and/or extension, the MLG door sequence valves control door operation. When the gear is down and locked or up and locked and the opposite position is selected, the MLG door sequence valves direct hydraulic pressure to the door up-lock actuating cylinders and the main door actuating cylinders. The MLG door up-locks release and the doors open. As the doors reach the full open position, the MLG sequence valves are repositioned. The MLG sequence valves in turn direct hydraulic pressure to the gear down-locks or up-locks and to the retract or extend side of the MLG actuating cylinders, depending on MLG selector valve position. When the gear reaches the selected position, the MLG door sequence valves again port hydraulic pressure to close and lock the doors.

## 3. Ground Access

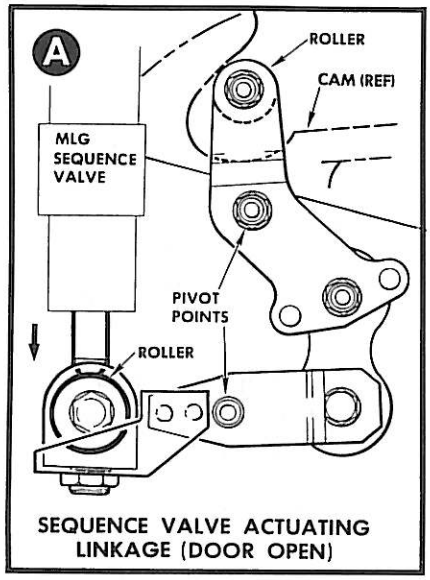
Access to the main landing gear wheel wells is gained by use of a main wheel well ground access system; see Figure 3. This system incorporates a ground access handle in the hydraulic compartment which actuates cables to release the door up-locks and, at the same time, actuates the emergency lever on MLG selector valve to vent hydraulic pressure to the return line. After actuating the handle, the doors are opened manually. A spring-loaded safety trigger holds the handle in position selected.

The system also includes a safety interlock device to prevent inadvertent return of the handle to the normal position until both doors are manually closed. This is accomplished by a spring-loaded plunger, controlled by the action of two rollers (one for each door), which moves under a cam on the bottom of the handle when the doors are opened. If the doors are opened

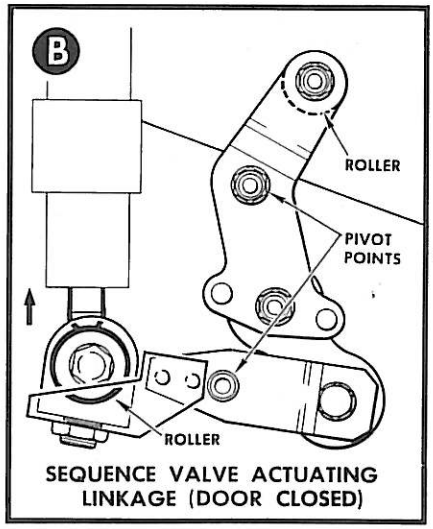



DOOR AFT ACTUATING MECHANISM SHOWN. FORWARD MECHANISM SIMILAR EXCEPT FOR DELETION OF SEQUENCE VALVE AND ACTUATING LINKAGE.

LEFT SIDE SHOWN (RIGHT SIDE SIMILAR)

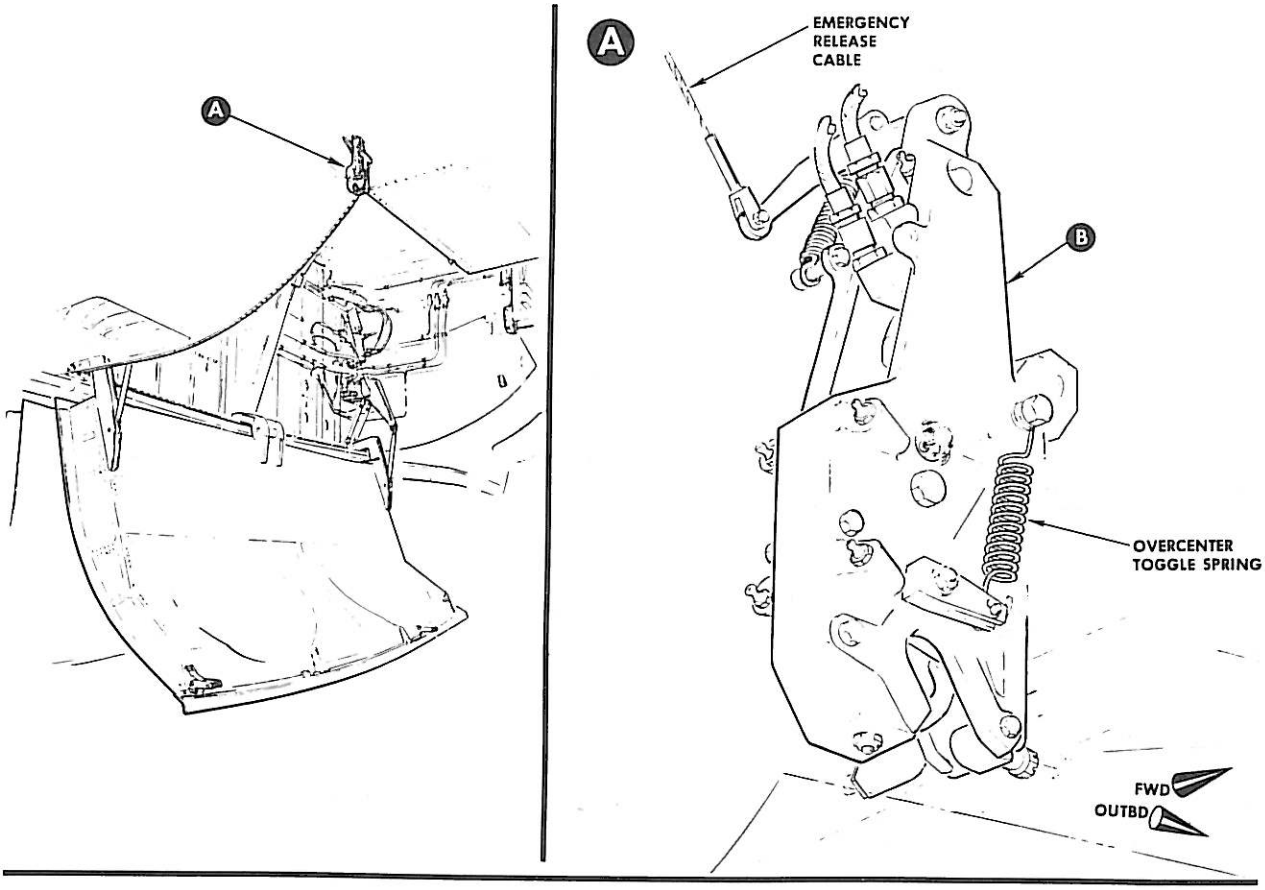


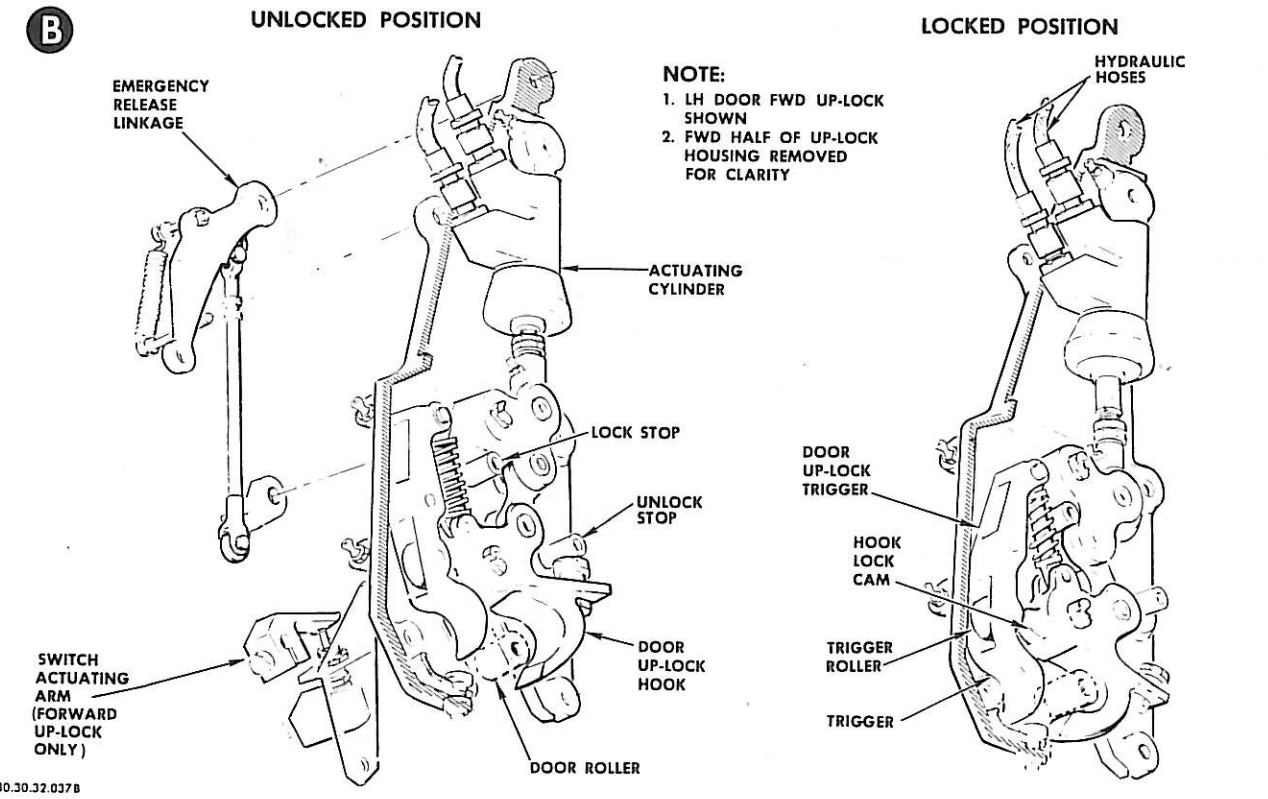

SEQUENCE VALVE ACTUATING LINKAGE (DOOR OPEN)

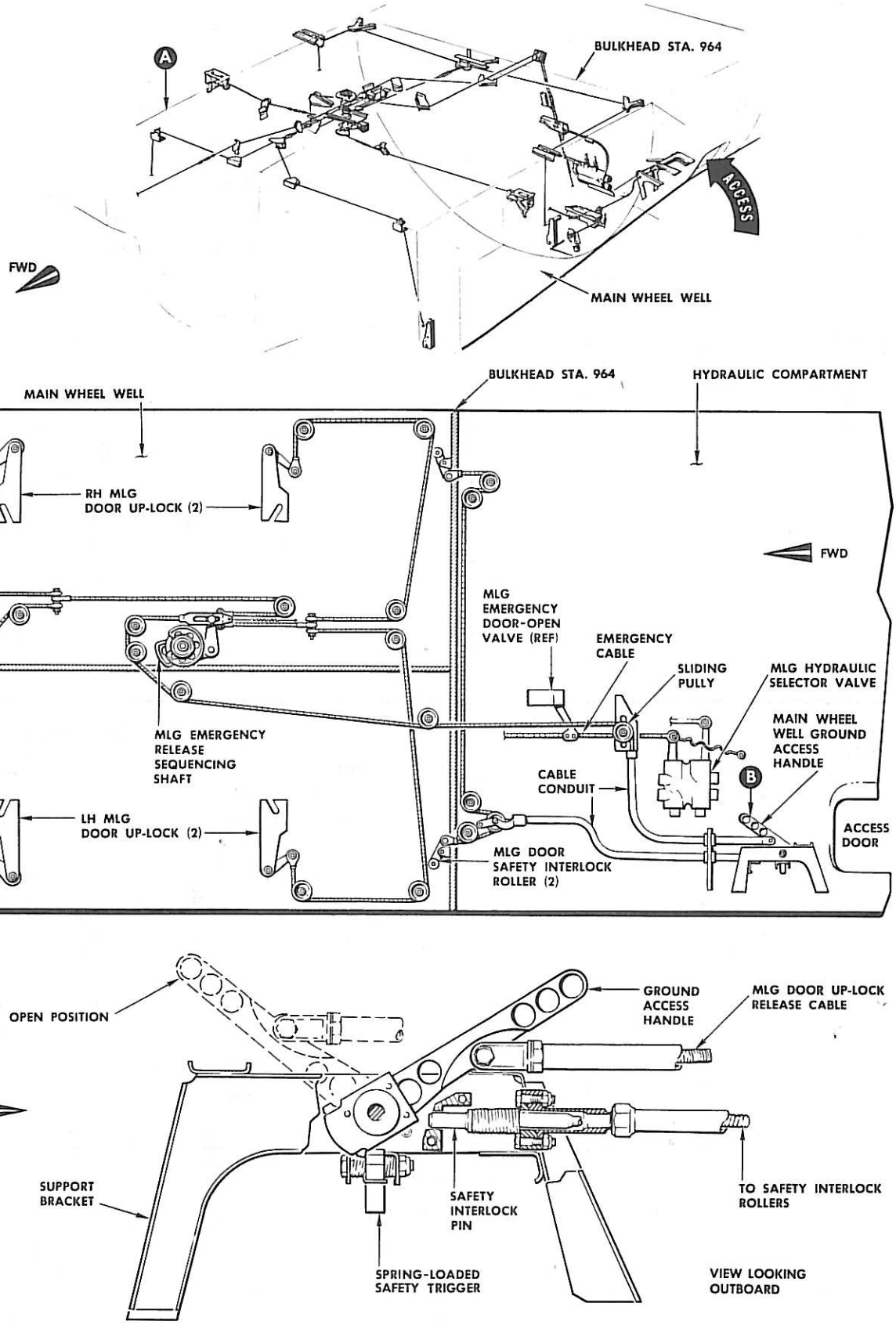



SEQUENCE VALVE ACTUATING LINKAGE (DOOR CLOSED)

30.30.32.036C


A
EMERGENCY RELEASE CABLE
B
OVERCENTER TOGGLE SPRING
FWD
OUTBD


B
UNLOCKED POSITION
LOCKED POSITION
NOTE:
1. LH DOOR FWD UP-LOCK SHOWN
2. FWD HALF OF UP-LOCK HOUSING REMOVED FOR CLARITY
EMERGENCY RELEASE LINKAGE
ACTUATING CYLINDER
LOCK STOP
UNLOCK STOP
SWITCH ACTUATING ARM (FORWARD UP-LOCK ONLY)
DOOR UP-LOCK HOOK
DOOR ROLLER
HYDRAULIC HOSES
DOOR UP-LOCK TRIGGER
HOOK LOCK CAM
TRIGGER ROLLER
TRIGGER
30.30.32.037B


A
BULKHEAD STA. 964
ACCESS
FWD
MAIN WHEEL WELL
A
MAIN WHEEL WELL
BULKHEAD STA. 964
HYDRAULIC COMPARTMENT
RH MLG
DOOR UP-LOCK (2)
FWD
MLG
EMERGENCY
DOOR-OPEN
VALVE (REF)
EMERGENCY
CABLE
SLIDING
PULLY
MLG HYDRAULIC
SELECTOR VALVE
MAIN WHEEL
WELL GROUND
ACCESS
HANDLE
MLG EMERGENCY
RELEASE
SEQUENCING
SHAFT
CABLE
CONDUIT
B
LH MLG
DOOR UP-LOCK (2)
ACCESS
DOOR
MLG DOOR
SAFETY INTERLOCK
ROLLER (2)
B
OPEN POSITION
GROUND
ACCESS
HANDLE
MLG DOOR UP-LOCK
RELEASE CABLE
FWD
SUPPORT
BRACKET
SAFETY
INTERLOCK
PIN
TO SAFETY INTERLOCK
ROLLERS
SPRING-LOADED
SAFETY TRIGGER
VIEW LOOKING
OUTBOARD

30.02.32.142 A

CONVAIR MODEL 30

MAINTENANCE MANUAL

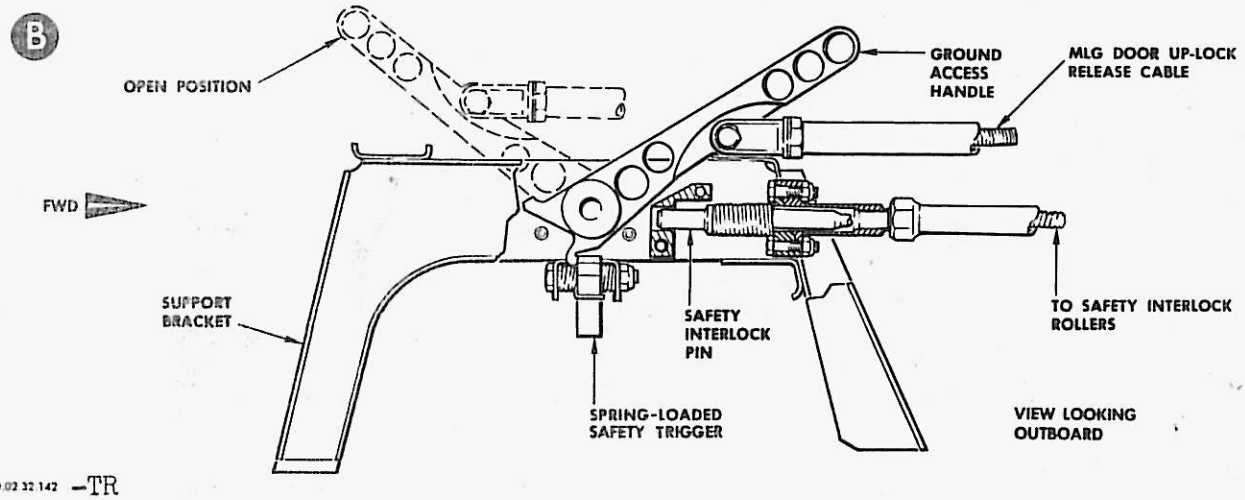
TEMPORARY REVISION NO. 32-54.

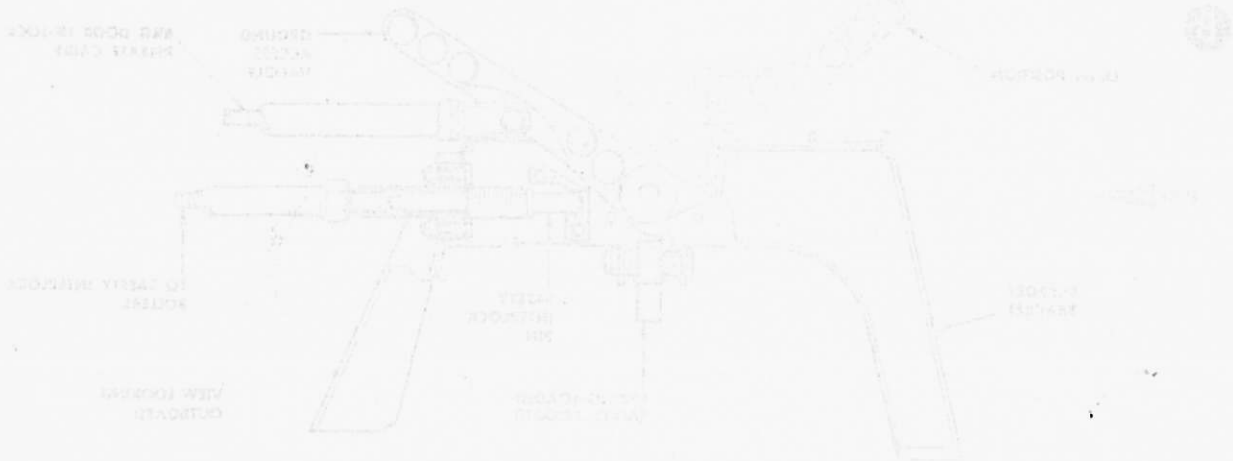
Insert facing 32-13-0, Page 4, dated Sep. 17/62 (or subsequent).

The illustration in this temporary revision is to be used for airplanes not modified per Service Bulletin No. 32-35. For those airplanes that have been modified per Service Bulletin No. 32-35, use Detail B on noted facing page.

Retain this temporary revision in your manual until all applicable airplanes have been modified per noted service bulletin.

Substitute the following in place of Detail B on noted facing page for unmodified airplanes:





manually, they must be manually closed and the ground access handle returned to the normal (forward) position prior to flight. The No. 2 hydraulic system also must be pressurized to ensure that doors close and lock when handle is returned to the normal position.

## MAIN LANDING GEAR (MLG) DOORS - MAINTENANCE PRACTICES

1. Adjustment/Test MLG Doors (see Figure 201)

A. Equipment Required.

(1) Hydraulic test unit (Skydrol 500A hydraulic fluid) capable of delivering 3000 psig.

(2) Hand hydraulic pump or equivalent to operate door up-locks.

(3) Two door rigging tools RGTL 30-05132-901, or equivalent.

B. Preparation.

(1) Ascertain that landing gear ground safety pins are installed.

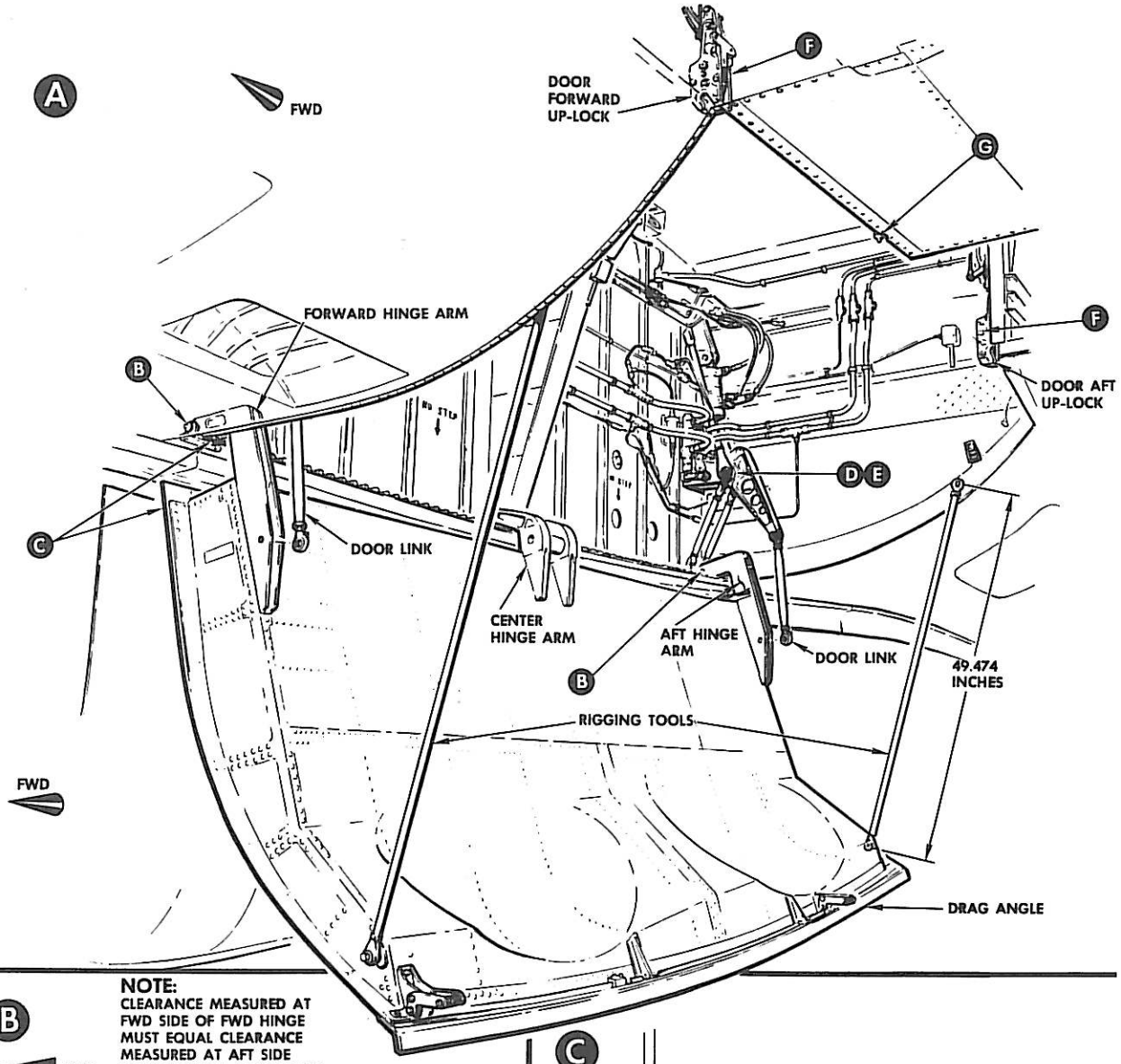
(2) Reduce hydraulic pressure to 0 psig (refer to Chapter 12, SERVICING).

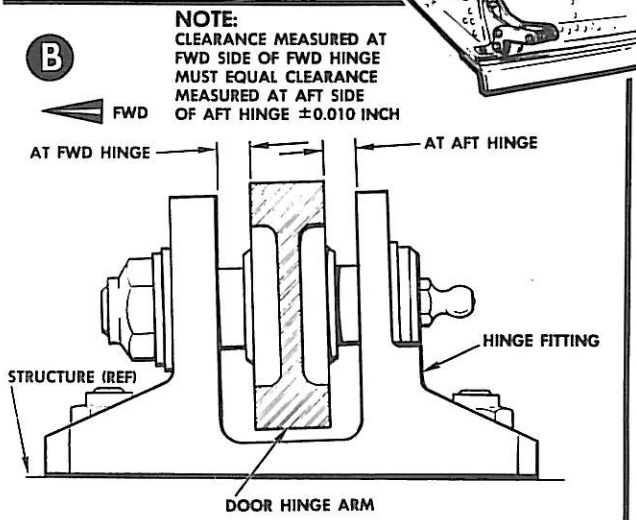
(3) Open and attach warning tag to LANDING GEAR POS & WARN circuit breaker, on main circuit breaker panel.

(4) Connect external source of hydraulic power to No. 2 hydraulic system (refer to Chapter 29, HYDRAULIC POWER). Do not apply hydraulic pressure.

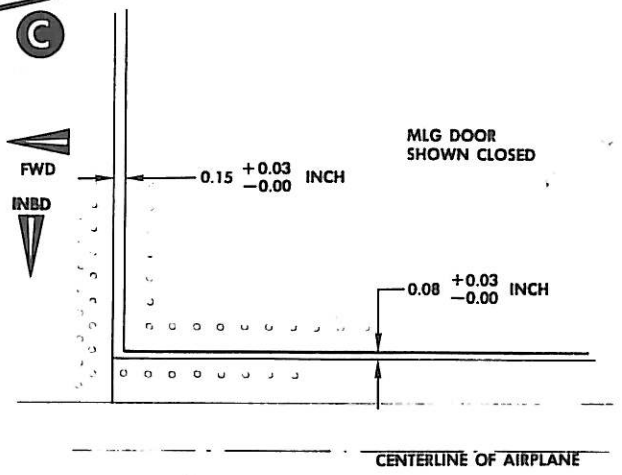
C. Adjustment/Test Procedure.

| | Figure Detail |
|---|---|
| (1) Operate main wheel well ground access handle in hydraulic compartment to release door up-locks; manually open doors. | |
| (2) Disconnect door links from door forward and aft hinge arms. | A |
| (3) Loosen bolts securing door drag angles. | A |
| (4) Check door installation as follows: | |
| (a) Aft gap at door aft hinge shall equal forward gap at door forward hinge (±0.010 inch). | B |
| (b) Fore and aft movement of door shall be within 0.005 to 0.010 inch. Add washers as required at center hinge to limit fore and aft movement and maintain equal hinge gaps as specified in step (a) preceding. | A,B |
| (c) Hold door in contour with fuselage and check door mismatch and skin gaps. | |
| 1) Gap between inboard edge of door and fuselage skin shall be 0.08 (+0.03, -0.00) inch. | C |



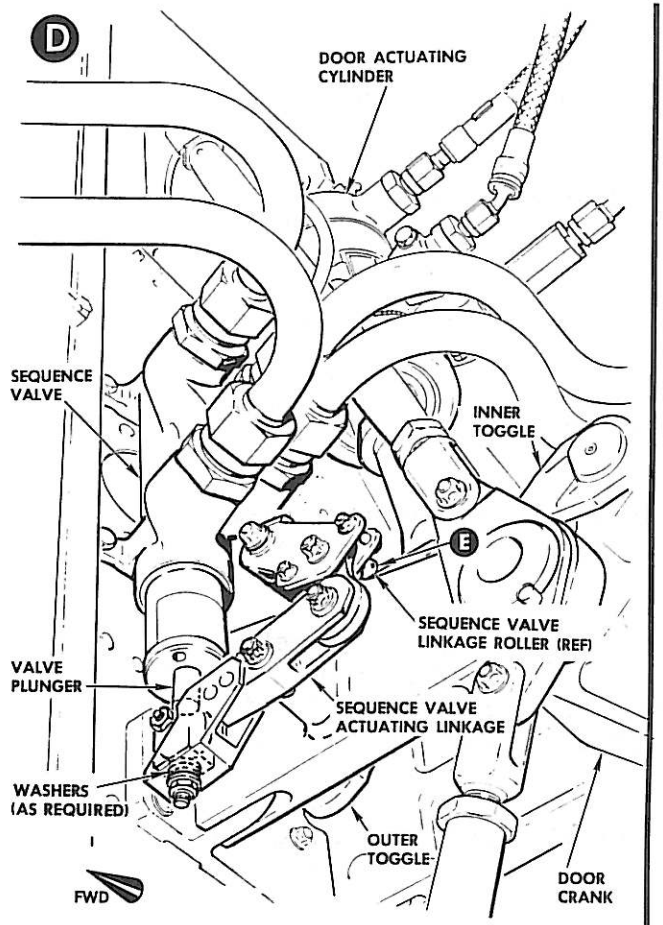




**HINGE CLEARANCES**
FORWARD HINGE SHOWN
AFT HINGE SIMILAR

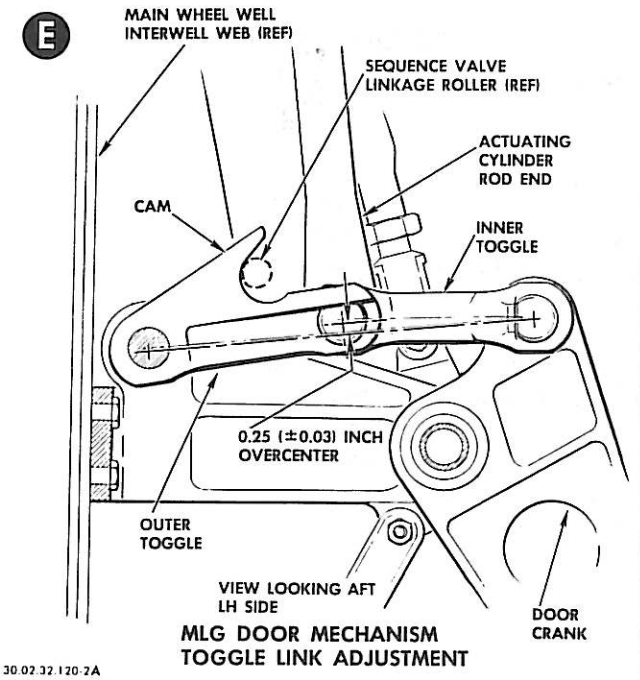



**MLG DOOR SKIN GAPS**

30.02.32.120-1A

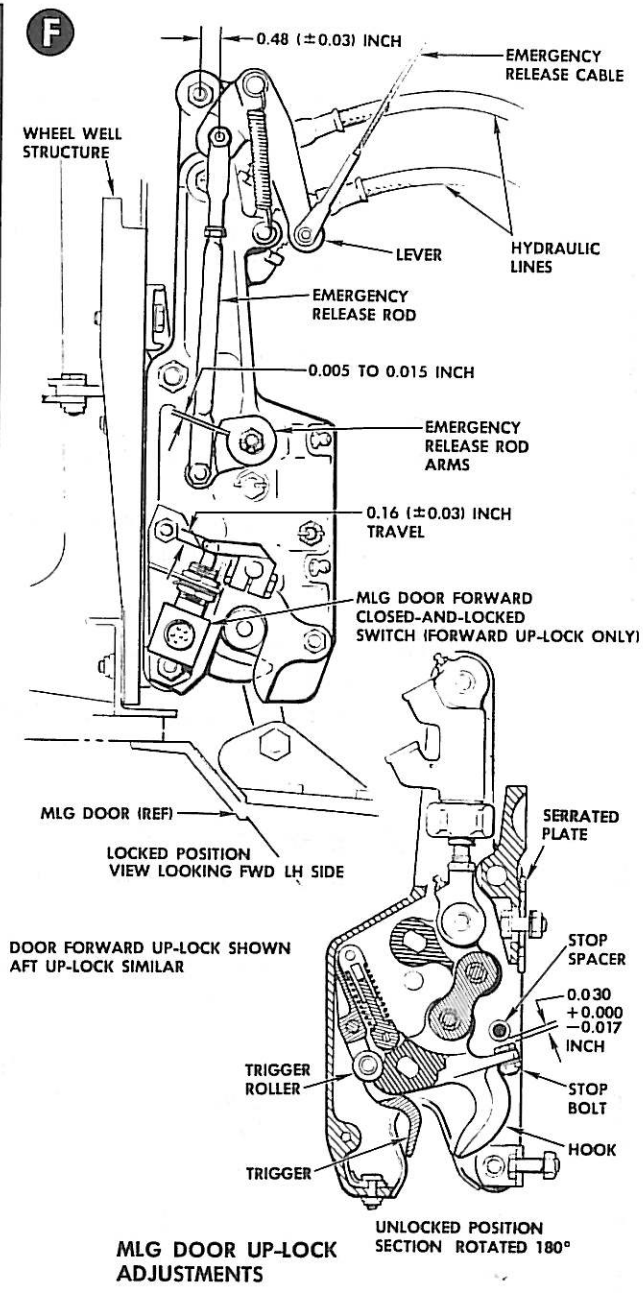



MLG SEQUENCE VALVE AND LINKAGE

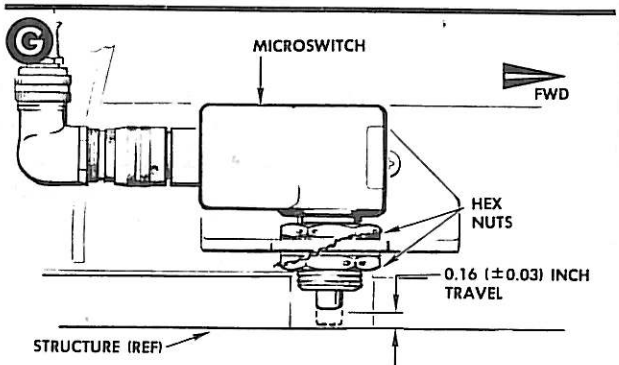



MLG DOOR MECHANISM TOGGLE LINK ADJUSTMENT

30.02.32.120-2A




MLG DOOR UP-LOCK ADJUSTMENTS




MLG DOOR AFT CLOSED-AND-LOCKED SWITCH ADJUSTMENT

Figure Detail

2) Gap between forward and aft edges of door and fuselage skin shall be 0.15 (+0.03, -0.00) inch. — C

3) Add or remove shims between door hinge arms and door structure to bring door flush with fuselage contour. — A

(d) With door held in contour, adjust drag angle to match wing contour and tighten bolts.

(5) Check adjustment of door actuating mechanisms and MLG sequence valves as follows:

NOTE: All castle nuts in the door actuating mechanisms to be torqued 5 to 10 inch-pounds and secured with cotter pins.

(a) With door actuating cylinder bottomed out in retracted position, toggle links shall be overcenter 0.25 (±0.03) inch. Adjust actuating cylinder rod end to obtain specified overcenter dimension. Tighten rod end jam nut and safety-wire. — D,E

(b) At the door aft actuating mechanisms, check MLG sequence valve adjustment.

1) Set the MLG sequence valve linkage so that roller engages door mechanism toggle link cam, allowing the valve plunger to fully extend. — D,E

2) Manually extend door actuating cylinder. The sequence valve linkage shall actuate to the "toggle locked" position and hold the MLG sequence valve plunger depressed.

NOTE: Check that roller on sequence valve actuating linkage clears toggle links when door mechanism is in approximate midpoint of travel.

3) As the sequence valve linkage passes overcenter to the "toggle locked" position, the sequence valve plunger shall have 0.020- to 0.050-inch overtravel remaining. Adjust as necessary by adding or removing washers between roller fork fitting and valve linkage lever.

Figure Detail

4) Return door actuating cylinder to the bottomed out, retracted position. Sequence valve linkage shall trip and allow sequence valve plunger to extend. — D

(6) Install door rigging tools RGTL 30-05132-901, or equivalent, between attach fittings on door and respective fuselage frames. — A

NOTE: Doors are in the rigged open position when distance between centers of the fuselage and door rigging tool attach fittings is 49.474 inches.

WARNING: DO NOT USE DOOR RIGGING TOOLS AS DOOR HOLD OPEN SAFETY DEVICES.

(7) Bottom door actuating cylinders in retracted position and adjust length of each door link to align with hinge arms; install bolt, washer, and nut. Torque nut finger-tight and secure with cotter pin. — A

(8) Remove door rigging tools.

(9) Check adjustment of MLG door up-locks as follows:

WARNING: PRIOR TO ACCOMPLISHING STEP (a) FOLLOWING, CHECK THAT NO. 2 HYDRAULIC SYSTEM IS NOT PRESSURIZED. SERIOUS INJURY TO PERSONNEL COULD RESULT IF SYSTEM PRESSURE IS NOT REDUCED.

(a) Disconnect emergency release cables from door up-locks. — F

(b) Identify and disconnect hydraulic lines from door up-lock cylinders and connect source of hydraulic pressure. Do not apply pressure. — F

(c) Manually load door up-lock hook in the closed direction and move trigger into the position between engaged and disengaged that results in minimum clearance between hook stop bolt and stop spacer. Adjust stop bolt shims to provide 0.030 (+0.000, -0.017)-inch clearance. — F

NOTE: The door forward up-locks must be removed to check the up-lock hook stop bolt clearance.

Figure
Detail

(d) Deleted.

(e) Check up-locks for freedom of operation as follows:

1) Disconnect the overcenter toggle spring on side of door up-lock.

2) Trip the up-lock trigger and manually operate hook from open to closed position. Manual operation shall be possible.

3) Reconnect overcenter toggle spring.

4) Apply 105 psig (maximum) hydraulic pressure to the retract port of door up-lock cylinder. Up-lock shall open and engage trigger.

5) Apply 3000 psig to the extend port of door up-lock cylinder (with retract port vented). Up-lock shall remain open.

WARNING: KEEP HANDS CLEAR OF UP-LOCK WHEN ACCOMPLISHING STEP 6), FOLLOWING, TO AVOID BODILY INJURY.

6) Apply 1000 psig hydraulic pressure to the extend port of door up-lock and manually trip up-lock trigger using suitable tool. Up-lock shall close.

(f) Loosen up-lock attachment bolts and lower up-locks to lowest mounting position on serrated plates. Temporarily secure up-locks. F

(g) Cock up-locks open.

(h) Manually close doors and hydraulically lock the door up-locks. Measure distance between wing opening and door.

(i) Release the up-locks and open the doors. Relocate up-locks on serrated plates to obtain proper seating of door. Use dimension obtained in step (h) preceding to determine up-lock position.

NOTE: Do not preload doors.

Figure Detail

(j) Reconnect emergency release cables to door up-locks. F

(k) Disconnect source of hydraulic pressure from the door up-lock cylinders and reconnect hydraulic lines as identified in step (9)(b). F

(10) Pressurize No. 2 hydraulic system (refer to Chapter 29, HYDRAULIC POWER).

WARNING: STAY CLEAR OF MLG DOORS WHEN PRESSURIZING NO. 2 HYDRAULIC SYSTEM.

(11) Check door up-lock emergency release cable adjustment as follows:

(a) Manually close MLG doors and return ground access handle to the normal (forward) position. MLG doors shall lock closed.

(b) With the door up-locks locked, check that 0.48 (±0.03)-inch dimension exists between emergency release lever attachment centerline and emergency release rod attachment centerline. (Refer to 32-6-0, steps 1.C.(8) if adjustment is required). F

(c) Check clearance between abutment faces of arms at lower end of up-lock emergency release rods on up-locks. Clearance shall be 0.005 to 0.015 inch. (Refer to 32-6-0, step 1.C.(8) if adjustment is required.) F

(d) Actuate ground access handle to door-open (aft) position. Door up-locks shall release and allow doors to open.

WARNING: STAY CLEAR OF MLG DOORS WHEN ACCOMPLISHING STEP (e) FOLLOWING.

(e) Manually open doors and check that the ground access handle interlock plunger and the safety trigger locks the handle in the door-open position. (Refer to 32-6-0, step 1.C.(9) if adjustment is required.)

(12) Check adjustment of the door closed-and-locked position switches. Switch plungers shall be depressed 0.16 (±0.03) inch with doors closed and locked, and in contour. F,G

(13) Deleted.

(14) Reduce hydraulic pressure to 0 psig (refer to Chapter 12, SERVICING).

(15) Remove warning tag and close LANDING GEAR POS & WARN circuit breaker.

(16) Bleed MLG hydraulic system (refer to 32-2-0) and check for hydraulic leaks.

(17) Perform Landing Gear System - Operational Check (refer to 32-0).

## MAIN LANDING GEAR (MLG) DOORS - MAINTENANCE PRACTICES

1. Removal/Installation MLG Doors (see Figure 201)

   A. Equipment Required - None.

   B. Preparation.

      (1) Reduce hydraulic pressure to 0 psig (refer to Chapter 12, SERVICING).

      (2) Open and attach warning tag to the HYD PUMP MOTOR CONT circuit breaker, on main circuit breaker panel.

   C. Remove MLG Door.

      (1) Operate ground access handle in hydraulic compartment to release MLG door up-locks; manually open MLG doors.

      (2) Remove cotter pins, bolts, washers, and nuts connecting door links to door.

      (3) Support MLG door and remove hinge pin bolts, washers, and nuts at the three hinge locations; remove door.

   D. Install MLG Door.

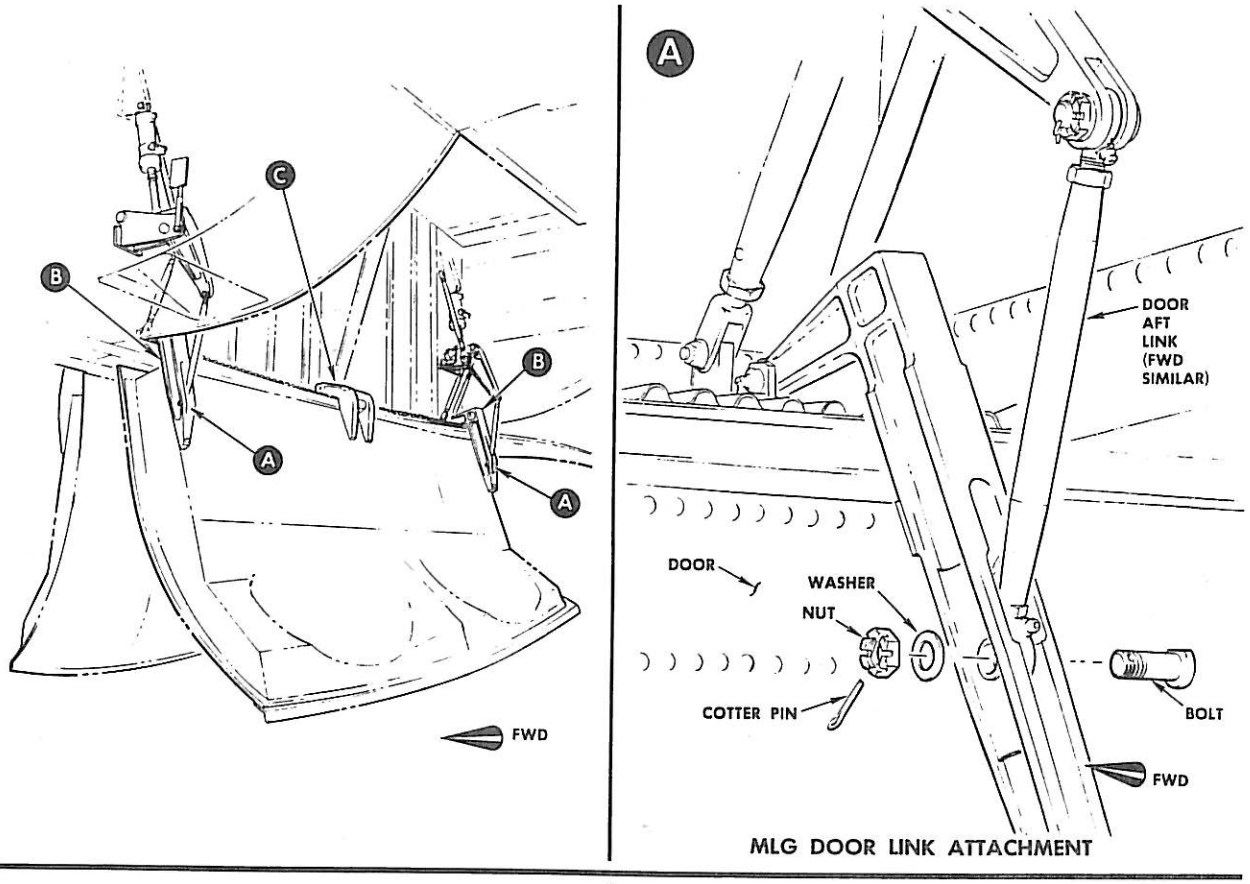
      (1) Place door in correct position and line up hinges; install forward and aft hinge pin bolts, washers and nuts.

      (2) Center door until gap at aft side of door aft hinge equals gap at forward side of door forward hinge (±0.010 inch).

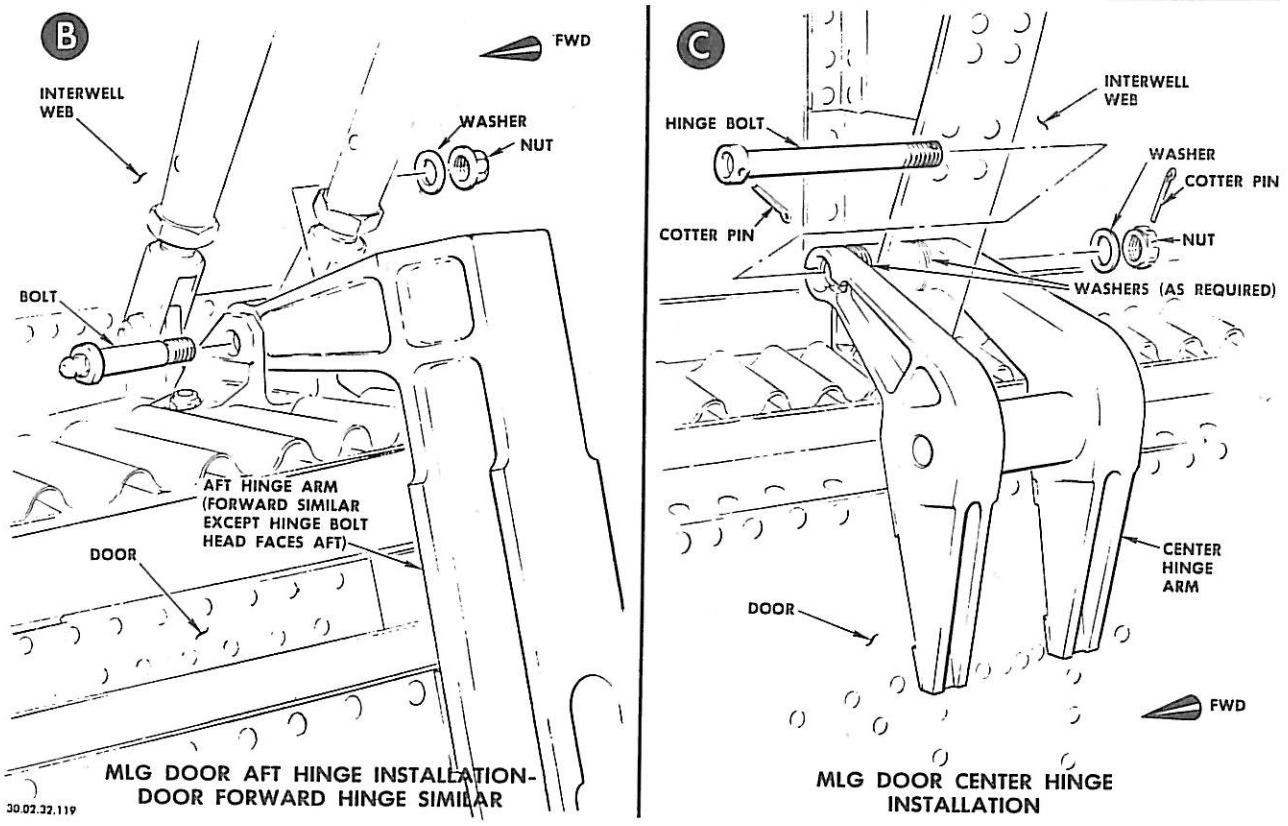
      (3) Add washers as required at center hinge to limit fore and aft movement within 0.005 to 0.010 inch. Install center hinge pin bolt, washer, and nut. Secure bolt and nut with cotter pins.

      (4) Trim edges of door to obtain 0.08 (+0.03, -0.00)-inch gap between inboard edge of door and fuselage skin, and 0.15 (+0.03, -0.00)-inch gap between fuselage skin and the forward and aft edges of door. Add or remove shims between hinge arms and door structure to bring door flush with fuselage contour.

      (5) Remove warning tag and close HYD PUMP MOTOR CONT circuit breaker.




MLG DOOR LINK ATTACHMENT




MLG DOOR AFT HINGE INSTALLATION-
DOOR FORWARD HINGE SIMILAR

30.02.32.119

MLG DOOR CENTER HINGE INSTALLATION

(6) Perform Adjustment/Test MLG Doors (refer to 32-13-0).

NOTE: If only the MLG door(s) has been replaced and no other rigging or adjustment has been changed, adjustment can be accomplished per 32-13-0, steps 1.B.(4), 1.C.(3), 1.C.(4)(d), 1.C.(6) thru 1.C.(9)(b), and 1.C.(9)(f) thru 1.C.(12). Operation can be checked per 32-0, steps 2.C.(4) thru 2.C.(13), 2.D.(5) thru 2.D.(5)(d)9), 2.D.(6)(b) thru 2.D.(6)(c)5) (excluding control lever force checks), 2.E.(2) thru 2.E.(5) (five cycles minimum), 2.H., 2.I.(1), and 2.I.(3) thru 2.I.(5).

(7) Deleted.

(8) Deleted.

## MAIN LANDING GEAR (MLG) FAIRING - MAINTENANCE PRACTICES

1. Removal/Installation MLG Fairing (see Figure 201)

A. Equipment Required - None.

B. Remove MLG Fairing.

| | Figure Detail |
|---|---|
| (1) Disconnect fairing links from MLG shock strut. | A,B |
| (2) At each fairing hinge cut safety wire and back off locknut; retract hinge pins flush with hinge pin housing bore. | C,D |

CAUTION: SUPPORT FAIRING WHILE RETRACTING HINGE PINS.

(3) Remove MLG fairing.

C. Install MLG Fairing.

(1) Install fairing links (if removed) on MLG fairing. Secure nut on each link attach bolt with cotter pin.

NOTE: Extend fairing links to maximum length with rod ends still visible through witness holes in tubes.

(2) Retract the two hinge pins on fairing until flush with hinge pin housing. C,D

(3) Deleted.

(4) Place fairing in wing opening, outboard of the MLG trunnions, and align hinge pins with hinge fittings in the wing. Extend hinge pins into their respective fittings. C,D

(5) Deleted.

(6) Perform Adjustment/Test MLG Fairing.

2. Adjustment/Test MLG Fairing (see Figure 201)

NOTE: The MLG must be properly rigged and adjusted prior to accomplishing fairing adjustment/test.

A. Equipment Required.

(1) Hydraulic test unit (Skydrol 500A hydraulic fluid) capable of delivering 3000 psig at 16 gpm.

(2) Airplane jacking equipment.

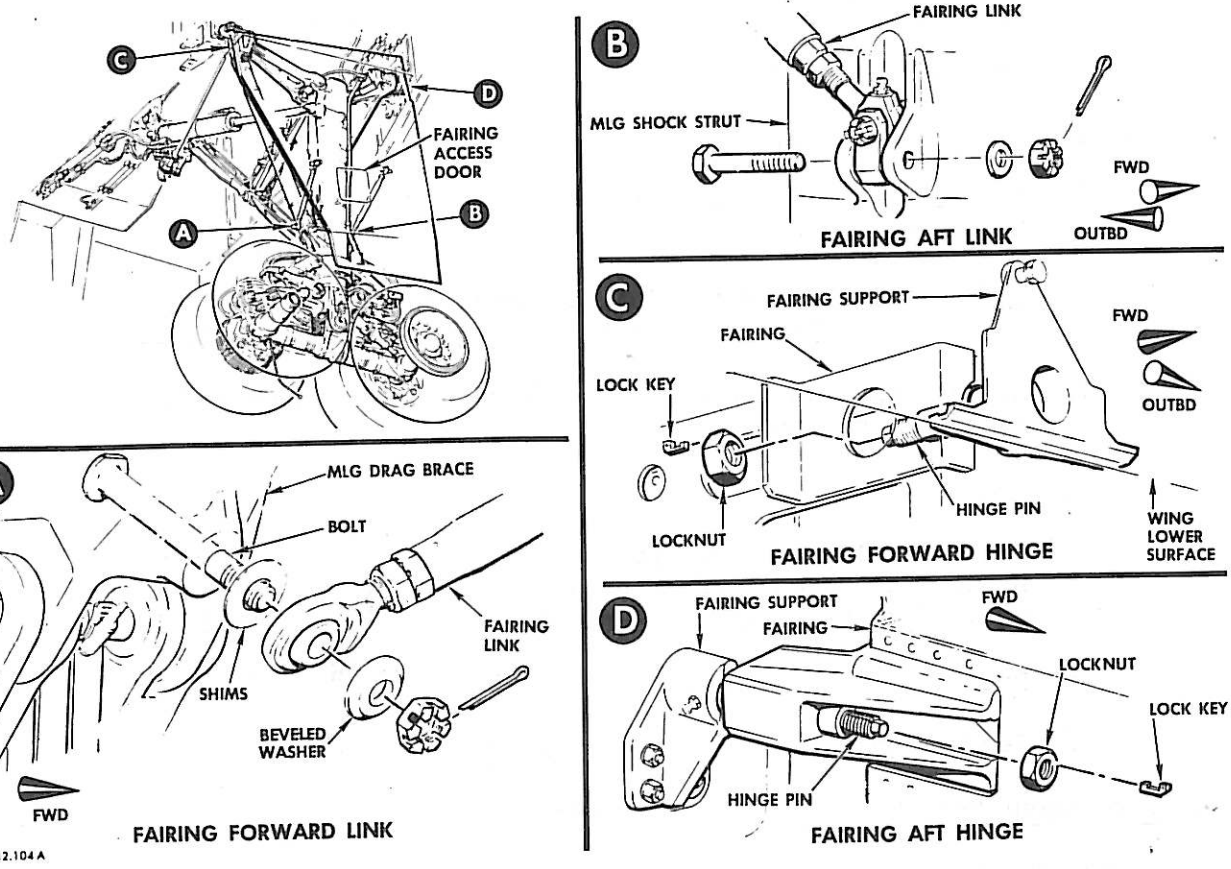

C
D
FAIRING ACCESS DOOR
A
B
A
MLG DRAG BRACE
BOLT
FAIRING LINK
SHIMS
BEVELED WASHER
FWD
FAIRING FORWARD LINK
30.02.32.104 A
B
FAIRING LINK
MLG SHOCK STRUT
FWD
OUTBD
FAIRING AFT LINK
C
FAIRING SUPPORT
FAIRING
FWD
LOCK KEY
OUTBD
HINGE PIN
LOCKNUT
WING LOWER SURFACE
FAIRING FORWARD HINGE
D
FAIRING SUPPORT
FAIRING
FWD
LOCKNUT
LOCK KEY
HINGE PIN
FAIRING AFT HINGE

Figure Detail

B. Preparation.

(1) Raise airplane on jacks until landing gear wheels clear the ground (refer to Chapter 7, LIFTING AND SHORING).

(2) Connect external source of hydraulic power to airplane (refer to Chapter 29, HYDRAULIC POWER).

(3) Disconnect fairing links at MLG shock strut and extend links to maximum length with rod ends still visible through witness holes in tubes. A,B

(4) Disconnect the MLG door links from the door mechanism cranks (refer to 32-13-5, step 1.C.(1)).

C. Procedure.

(1) With the MLG down and locked and airplane supported on wing jacks, retract or extend appropriate hinge pins to center the fairing in wing opening. Fairing forward and aft movement shall be 0.000 to 0.002 inch. C,D

NOTE: When airplane is supported by landing gear and after high gross loading, fairing forward and aft movement shall not exceed 0.090 inch. Fairing shall not interfere with wing skin in the gear extended position. To correct interference, adjust fairing hinge pins to allow 0.060 to 0.090 inch forward and aft fairing movement.

(2) Trim fairing forward and aft edges at outboard end (parallel edges in area of fairing pivot) to obtain 0.040 to 0.080 inch clearance between fairing and wing skin.

(3) Remove landing gear ground safety pins.

(4) Pressurize No. hydraulic system and retract MLG to the up-and-locked position.

(5) Trim remainder of fairing (excluding areas trimmed in step (2) preceding) to obtain 0.12 inch gap between fairing and wing skin.

(6) Return MLG to the down-and-locked position and connect links to MLG shock strut. A,B

NOTE: Install beveled washer with bevel facing forward.

Figure
Detail

(7) Disconnect link from fork on MLG door sequence valve (refer to 32-2-3, step 1.C.(1)).

(8) Slowly retract the MLG to the up-and-locked position.

(9) Remove fairing access door and alternately shorten fairing links until fairing is flush with contour of wing. — A,B

NOTE: Maintain "gear up" hydraulic pressure throughout adjustment so gear will be at highest position. Do not preload fairing.

(10) Lower MLG to the down-and-locked position and install ground safety pins.

(11) Reconnect link to the fork on MLG door sequence valve (refer to 32-2-3, step 1.D.(5)).

(12) At the fairing links and hinge pins, tighten locknuts and safety-wire to lock keys. Reinstall fairing access panel. — A,B,C,D

NOTE: Lock keys shall engage slot in hinge fittings and links.

(13) Secure castle nut on each link attach bolt with cotter pin.

(14) Reconnect MLG door mechanism links to door mechanism cranks with bolts, washers, and nuts. Torque nuts fingertight and secure with cotter pins.

(15) Disconnect external source of hydraulic power from airplane.

(16) Lower airplane and remove jacks (refer to Chapter 7, LIFTING AND SHORING).

## MAIN LANDING GEAR (MLG) DOOR UP-LOCKS - MAINTENANCE PRACTICES

1. Removal/Installation MLG Door Up-Locks (see Figure 201)

A. Equipment Required - None.

B. Preparation.

(1) Reduce hydraulic pressure to 0 psig (refer to Chapter 12, SERVICING).

(2) Open and attach warning tags to the following circuit breakers, on main circuit breaker panel:

LANDING GEAR POS & WARN.

HYD PUMP MOTOR CONT.

C. Remove MLG Door Up-Lock.

(1) Operate ground access handle in hydraulic compartment to release MLG door up-locks; manually open MLG doors.

(2) If removing door forward up-lock, remove door closed-and-locked switch from aft side of door up-lock (refer to 32-10-6).

(3) Disconnect emergency release cable from lever on door up-lock.

(4) Identify and disconnect two hydraulic lines from door up-lock actuating cylinder.

(5) Remove four mounting bolts, washers, and nuts and remove MLG door up-lock.

D. Install MLG Door Up-Lock.

(1) Place MLG door up-lock in position on mounting bracket and secure with four bolts, washers, and nuts.

(2) Adjust door up-lock and emergency release cable (refer to 32-13-0, steps 1.B.(4) and 1.C.(9) thru 1.C.(11).

NOTE: Hydraulic lines are connected to up-lock during adjustment/test procedure.

(3) Deleted.

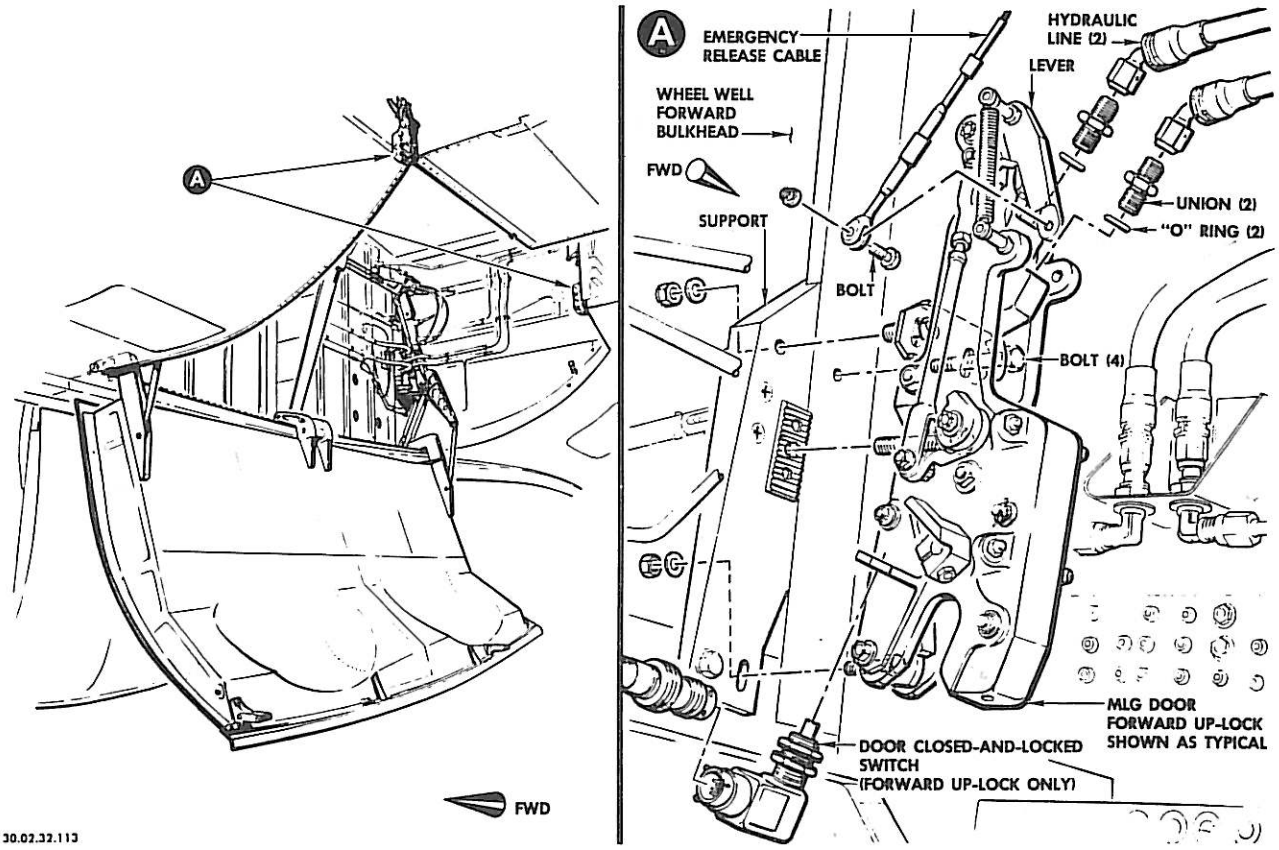
(4) Deleted.

(5) If installing door forward up-lock, install and adjust door closed-and-locked switch on door up-lock (refer to 32-10-6 for installation and 32-13-0, step 1.C.(12) for adjustment).

(6) Remove warning tags and close circuit breakers opened in step B.

(7) Perform landing gear operational check (refer to 32-0) and check up-lock installation for hydraulic leaks.

NOTE: If only the MLG door up-lock(s) has been replaced and no other rigging or adjustment has been changed, operation can be checked per 32-0, steps 2.C.(4) thru 2.C.(13), 2.D.(5) thru 2.D.(5)(d) 9), 2.D.(6)(b) thru 2.D.(6)(c)5) (excluding control lever force checks), 2.E.(3) thru 2.E.(5) (five cycles minimum), 2.I.(1), and 2.I.(3) thru 2.I.(5).



MAIN WHEEL WELL (MWW) GROUND ACCESS SYSTEM - MAINTENANCE PRACTICES

1. Removal/Installation MWW Ground Access Handle and Teleflex Cable (see Figure 201)

A. Equipment Required - None.

B. Preparation.

(1) Reduce hydraulic pressure to 0 psig (refer to Chapter 12, SERVICING).

(2) Open and attach warning tag to the HYD PUMP MOTOR CONT circuit breaker, on main circuit breaker panel.

C. Remove Ground Access Handle and Teleflex Cable.

(1) Gain access to ground access handle and Teleflex cable through hydraulic compartment door.

(2) Disconnect ground access cable at turnbuckle above sliding pulley bracket on forward bulkhead of hydraulic compartment.

(3) Remove bolt and nut attaching clevis rod to ground access handle.

(4) Remove bolt and nut securing handle to support bracket; remove ground access handle.

(5) Loosen lockbolt on clevis rod and remove clevis rod from Teleflex cable. Remove Teleflex cable from upper end of conduit.

(6) Remove two clips that secure conduit to support angle and sliding pulley bracket.

(7) Cut safety wire and disconnect Teleflex control from the conduit and the ground access handle support bracket; remove Teleflex control.

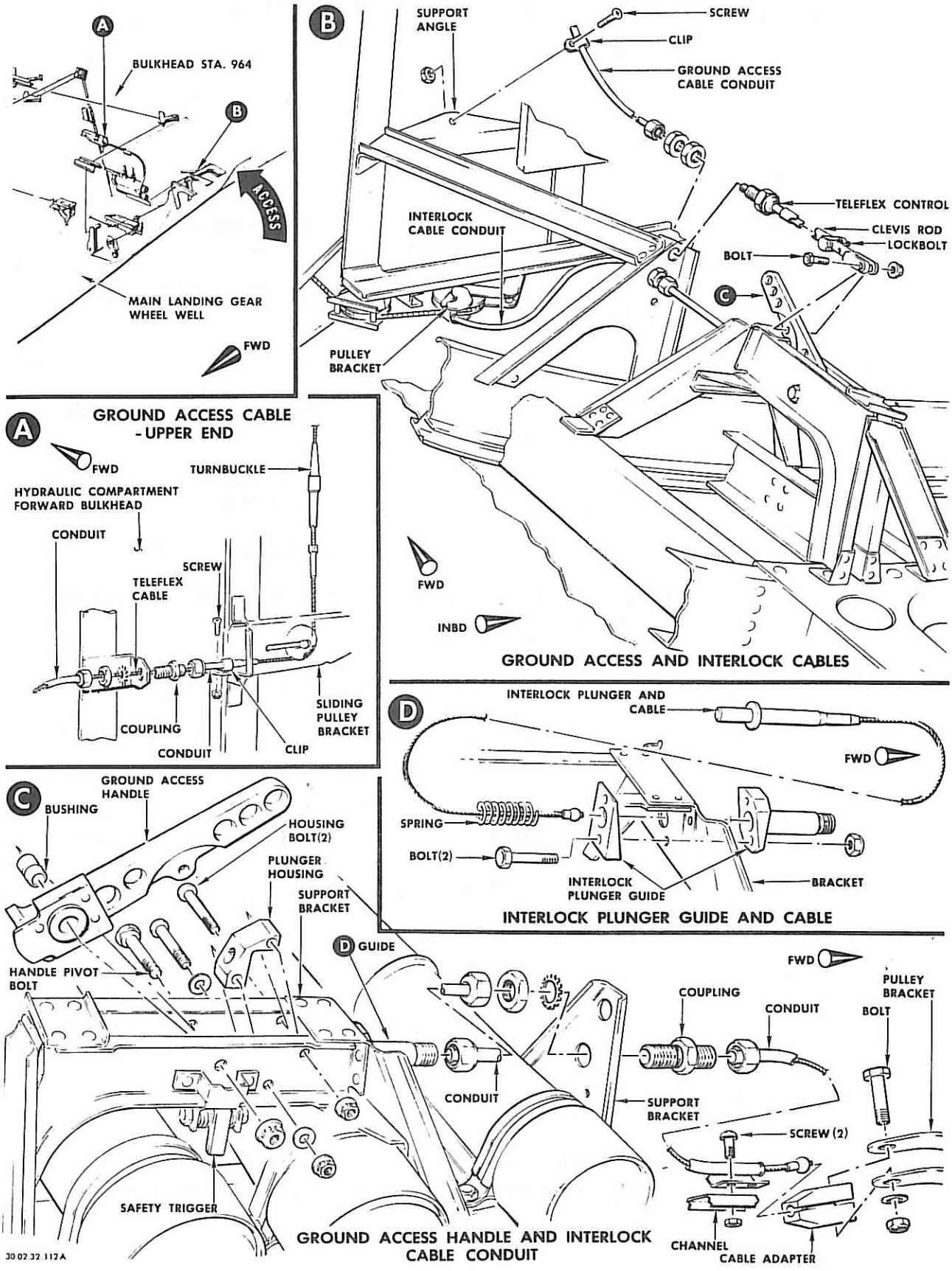
(8) Cut safety wire and disconnect conduit coupling from upper support bracket; remove conduit.

D. Install MWW Ground Access Handle and Teleflex Cable.

(1) Place conduit in correct position and install coupling securing conduit to upper support bracket.

(2) Install Teleflex control at lower end of conduit, securing conduit to the ground access handle support bracket.

(3) Install two clips securing conduit to support angle and pulley bracket. Safety-wire conduit upper coupling and the Teleflex control hex nuts.




Main Wheel Well Ground Access Handle and Cable Installation
Figure 201

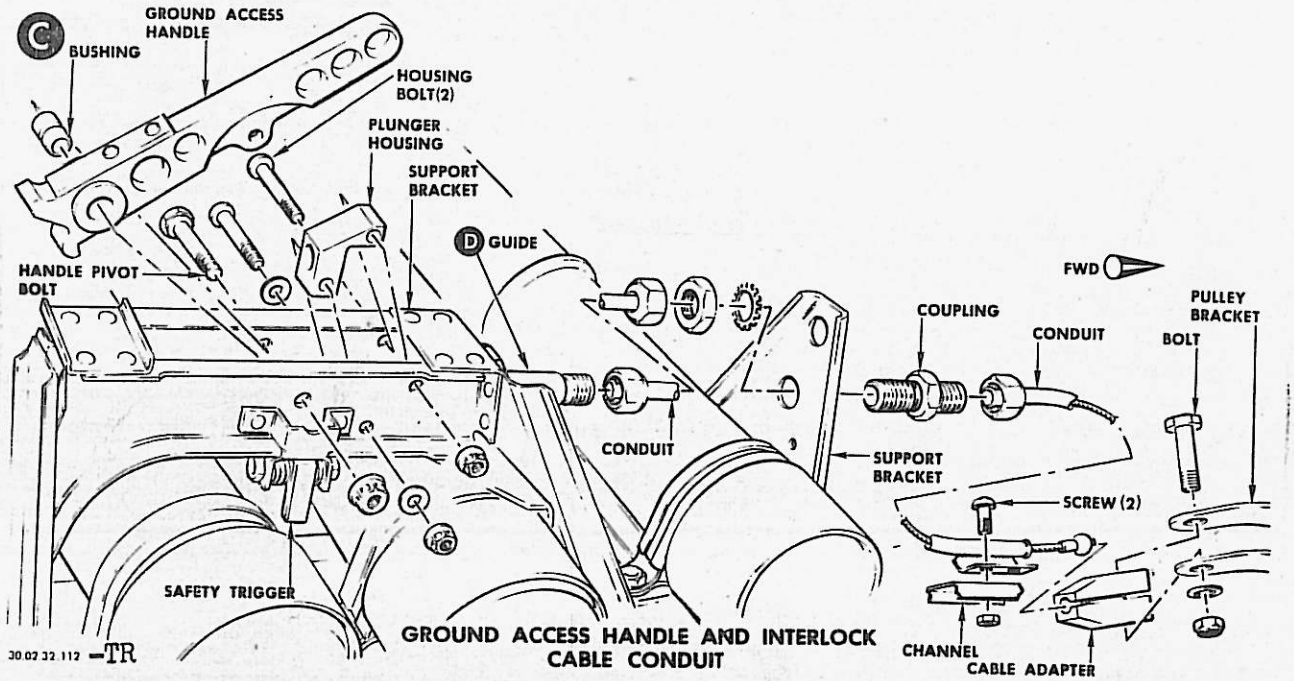
TEMPORARY REVISION NO. 32-55.

Insert facing 32-13-4, Page 202, dated Sep. 17/62 (or subsequent).

The illustration in this temporary revision is to be used for airplanes not modified per Service Bulletin No. 32-35. For those airplanes that have been modified per Service Bulletin No. 32-35, use Detail C on noted facing page.

Retain this temporary revision in your manual until all applicable airplanes have been modified per noted service bulletin.

Substitute the following in place of Detail C on noted facing page for unmodified airplanes:




GROUND ACCESS HANDLE AND INTERLOCK CABLE CONDUIT

(4) Route Teleflex cable through lower pulley bracket and the conduit; install clevis rod and tighten lockbolt.

NOTE: Teleflex cable shall be visible through witness hold in clevis rod.

(5) Install ground access handle in support bracket and secure to clevis rod with bolt and nut.

(6) Connect ground access cable with turnbuckle above sliding pulley bracket in hydraulic compartment.

(7) Remove warning tag and close HYD PUMP MOTOR CONT circuit breaker.

(8) Rig MWW ground access cable (refer to 32-6-0, steps 1.B.(8) and 1.C.(9)).

(9) Perform main wheel well ground access system operational check (refer to 32-0, steps 2.H. and 2.I.(4)).

2. Removal/Installation MWW Ground Access Interlock Cable (see Figure 201)

A. Equipment Required - None.

B. Preparation.

(1) Reduce hydraulic pressure to 0 psig (refer to Chapter 12, SERVICING).

(2) Open and attach warning tag to the HYD PUMP MOTOR CONT circuit breaker, on main circuit breaker panel.

C. Remove MWW Ground Access Interlock Cable.

(1) Gain access to the interlock cable through the hydraulic compartment door.

(2) Disconnect interlock cable adapter from pulley bracket forward of ground access handle; remove adapter.

(3) Remove bolt and nut attaching Teleflex control clevis rod to ground access handle.

(4) Remove ground access handle pivot bolt and nut; remove handle and bushing.

(5) Remove two bolts, washers, and nuts securing plunger housing in support bracket.

(6) Disconnect conduit from the interlock plunger guide.

(7) Remove two bolts and nuts securing interlock plunger guide to the ground access handle support bracket; remove plunger housing, guide, plunger, and cable assembly.

(8) Remove two screws and nuts securing forward end of conduit to support bracket.

(9) Cut safety wire and disconnect conduit coupling from support bracket; remove conduit.

D. Install MWW Ground Access Interlock Cable.

(1) Place conduit in position and install coupling securing conduit to support bracket.

(2) Route interlock cable through conduit and install plunger housing, guide, and plunger assembly in the ground access handle support bracket.

(3) Install two bolts and nuts securing interlock plunger guide to support bracket.

(4) Install two bolts, washers, and nuts securing plunger housing in support bracket.

(5) Connect conduit to the interlock plunger guide.

(6) Install two screws and nuts attaching forward end of conduit to support bracket; safety-wire conduit coupling hex nuts.

(7) Connect the interlock cable to pulley bracket with adapter.

(8) Remove warning tag and close HYD PUMP MOTOR CONT circuit breaker.

(9) Rig MWW ground access interlock cable (refer to 32-6-0, steps 1.B.(8) and 1.C.(9)(e) thru 1.C.(9)(l)).

(10) Perform main wheel well ground access system operational check (refer to 32-0, steps 2.H. and 2.I.(4).

## MAIN LANDING GEAR (MLG) DOOR MECHANISMS - MAINTENANCE PRACTICES

1. Removal/Installation MLG Door Mechanisms (see Figure 201)

   A. Equipment Required - None.

   B. Preparation.

      (1) Reduce hydraulic pressure to 0 psig (refer to Chapter 12, SERVICING).

      (2) Open and attach warning tag to the HYD PUMP MOTOR CONT circuit breaker, on main circuit breaker panel.

   C. Remove MLG Door Mechanism.

      (1) Remove cotter pin, bolt, washer, and nut connecting door link to mechanism crank.

      (2) Remove cotter pin, bolt, washer, and nut connecting actuating cylinder rod end to mechanism toggle links.

      (3) If removing MLG door forward mechanism, remove four bolts, washers, and nuts attaching support brace to mechanism fulcrum bracket and wheel well interwell web; remove support brace.

      (4) If removing MLG door aft mechanism, remove two bolts, washers, and nuts securing mechanism fulcrum bracket to support brace on wheel well aft bulkhead.

      (5) Remove bolts, washers, and nuts connecting upper and lower support tubes to mechanism fulcrum bracket.

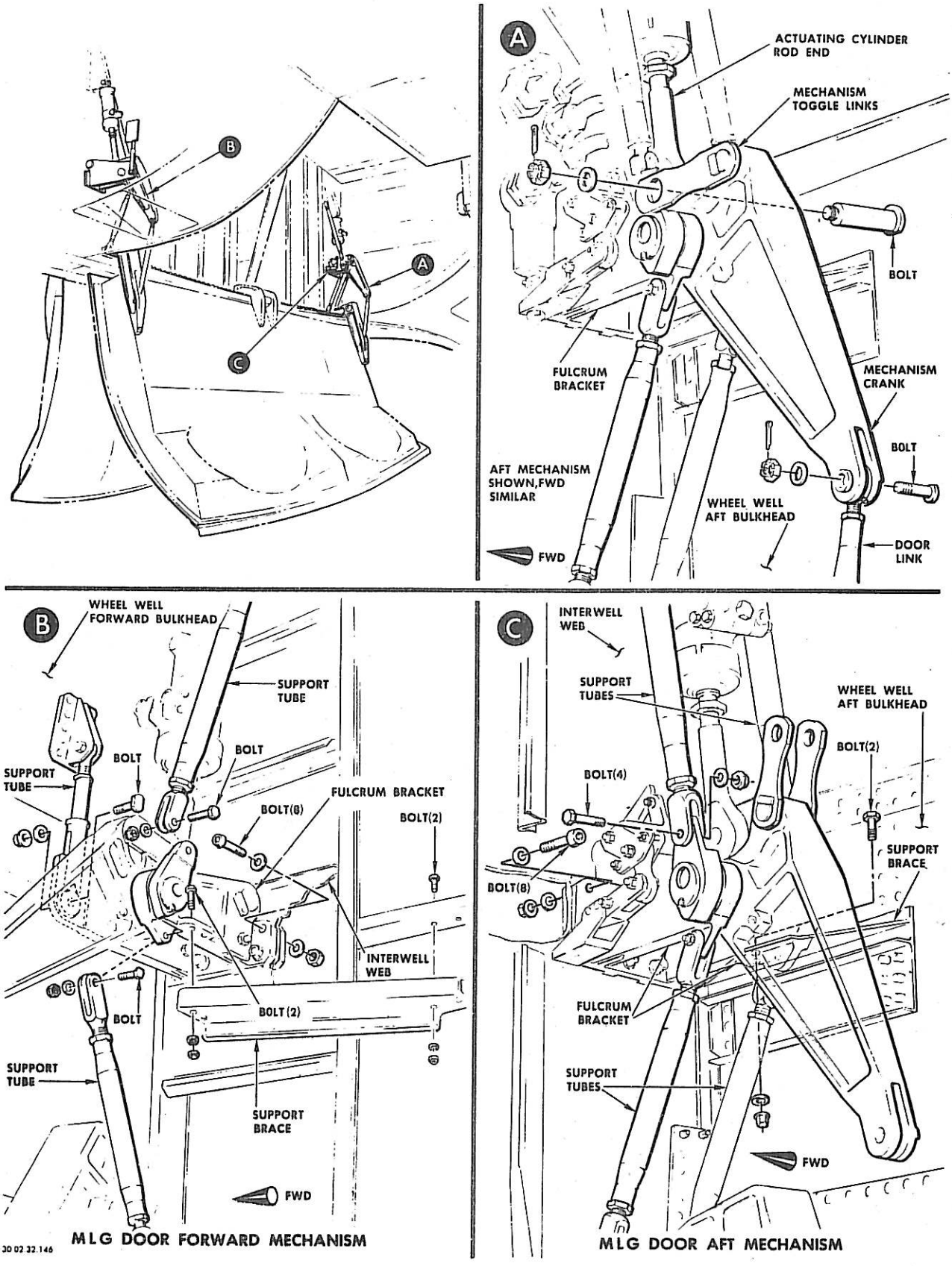
      (6) Remove eight bolts, washers, and nuts attaching mechanism fulcrum bracket to interwell web; remove MLG door mechanism.

   D. Install MLG Door Mechanism.

      (1) Place door mechanism in correct position on interwell web and align left and right door mechanism fulcrum brackets with holes in interwell web. Install eight bolts, washers, and nuts attaching fulcrum brackets to interwell web.

      (2) Align upper and lower support tubes with attachment holes in mechanism fulcrum bracket; install bolts, washers, and nuts.

         NOTE: If installing MLG door forward mechanism, install bolt at lower end of forward upper support tube with bolt head facing aft.






Main Landing Gear Door Mechanism Installation
Figure 201

(3) If installing MLG door forward mechanism, align support brace with attachment holes in mechanism fulcrum bracket and interwell web, and secure with four bolts, washers, and nuts.

(4) If installing MLG door aft mechanism, install two bolts, washers, and nuts securing mechanism fulcrum bracket to support brace on wheel well aft bulkhead.

(5) Connect actuating cylinder rod end to mechanism toggle links with bolt, washer, and nut. Secure nut with cotter pin.

NOTE: Torque all castle nuts in the MLG door mechanisms, including the door link attachment bolts, to 5 to 10 inch-pounds and secure with cotter pins. Torque mechanism crank pivot bolt nuts to a snug fit and safety-wire to fulcrum brackets.

(6) Remove warning tag and close HYD PUMP MOTOR CONT circuit breaker.

(7) Perform Adjustment/Test MLG Doors (refer to 32-13-0).

NOTE: If the MLG door mechanisms only have been replaced and no other rigging or adjustment has been changed, adjustment can be accomplished per 32-13-0, steps 1.B.(1) thru 1.B.(4) and 1.C.(5) thru 1.C.(8). Operation can be checked per 32-0, steps 2.C.(4) thru 2.C.(13), 2.D.(5) thru 2.D.(5)(d) 9), 2.D.(6)(b) thru 2.D.(6)(c) 5) (excluding control lever force checks), and 2.I.(1) thru 2.I.(5).

# NOSE LANDING GEAR (NLG) DOORS - DESCRIPTION AND OPERATION

## 1. General

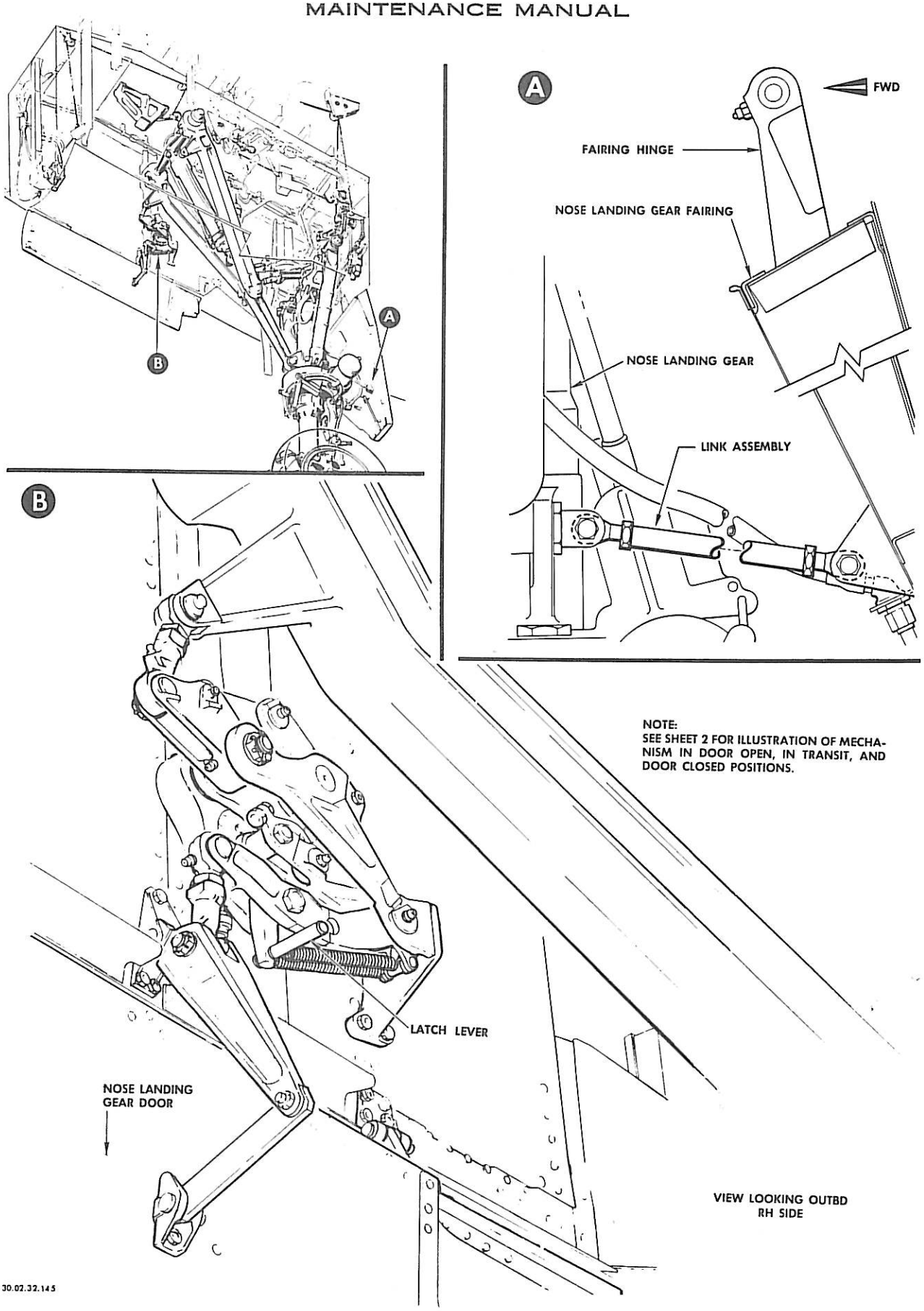
The nose wheel well is enclosed by two clamshell doors and a fairing; see Figure 1. The two doors are hinged at the outboard edge and pivot inward and up to close. They are actuated mechanically by connections to the gear drag brace. The nose landing gear doors are cycled to close when the gear is fully retracted or fully extended. They open only to permit exit of the nose landing gear. The nose landing gear fairing is hinged across the aft end of the nose wheel well and is mechanically linked to the shock strut. When the nose landing gear moves forward and up, it pulls the fairing closed. A hydraulically actuated door up-lock mechanism on the forward bulkhead of the nose wheel well locks the nose landing gear doors closed when the nose landing gear is retracted; see Figure 2.

## 2. Operation

Nose landing gear door actuating motion is obtained from arms extending down from the nose landing gear drag brace assembly; see Figure 1. Separate arms drive the door actuating mechanism for the left and right doors. Each door actuating mechanism is reciprocal in its action in that it opens and closes the door during gear retraction or extension. It transforms the one-way motion of the drag brace into a two-way motion for opening and closing the door.

Assume that the gear is retracted and the nose wheel doors are closed. When the landing gear is extended, the drag brace assembly starts rotating to the down position. The initial movement of the drag brace is converted into a relatively large movement at the door hinge; see Figure 1, Detail "C". This provides rapid door opening to clear the nose wheels. When the gear is approximately half way down, the lower links of the door actuating mechanism pass overcenter; see Figure 1, Detail "D". On passing overcenter, the lower links begin to pull the doors up to the closed position. When the nose landing gear reaches the down position, the doors are fully closed; see Figure 1, Detail "E". When the nose landing gear is retracted, the above operations are reversed. Also, when the nose landing gear is retracted, the doors are locked closed by the door up-lock mechanism on the forward bulkhead of the nose wheel well. The nose landing gear hydraulic system releases the door up-lock as the first step in the gear extension sequence, and locks the door closed as the last step of the retraction sequence. The doors droop approximately 1 1/2 inches and are not hydraulically locked when the nose landing gear is extended.

On the ground, the nose landing gear doors are opened individually by pushing forward on the latch lever illustrated in Figure 1, Detail "B". Access to the latch levers is gained through the opening left by the fairing when the gear is extended. When operating the latch levers, the doors should be held and lowered slowly to prevent possible injury from a falling door. The doors are closed by manually pushing them to the closed position; the

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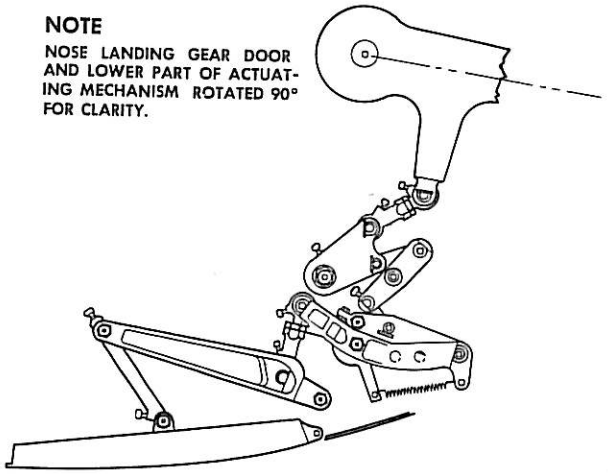
Nose Landing Gear Door Actuating Mechanism
Figure 1 (Sheet 1 of 2)

C

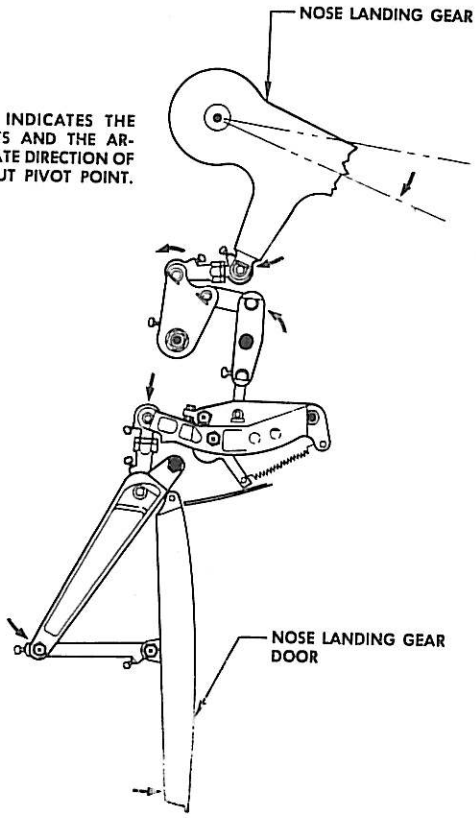
**NOTE**
NOSE LANDING GEAR DOOR AND LOWER PART OF ACTUATING MECHANISM ROTATED 90° FOR CLARITY.



GEAR UP—DOORS CLOSED

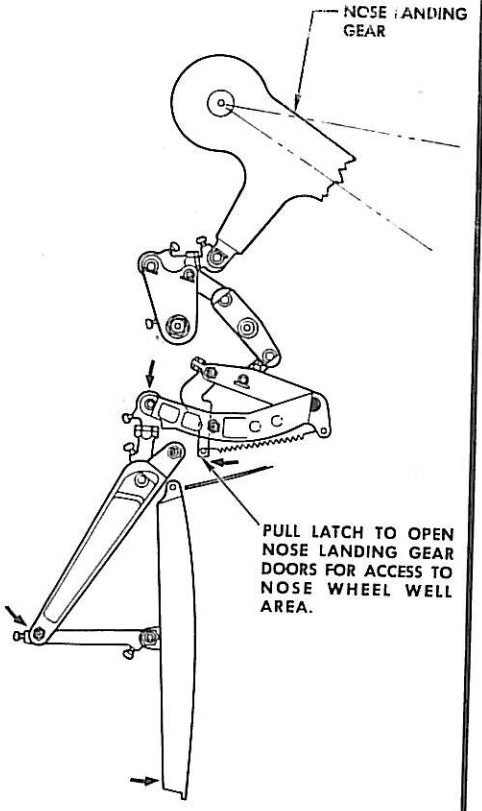
D

**NOTE**
LARGE DOT INDICATES THE PIVOT POINTS AND THE ARROWS INDICATE DIRECTION OF TRAVEL ABOUT PIVOT POINT.



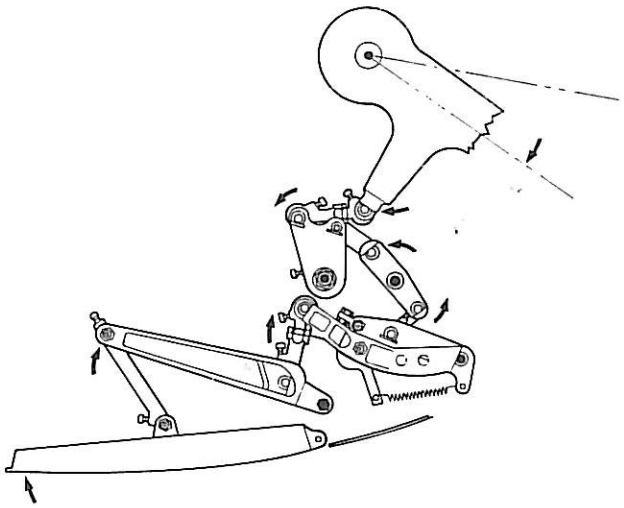

GEAR IN TRANSIT (HALFWAY DOWN)—DOORS OPEN

F




GEAR DOWN—DOORS OPEN FOR ACCESS

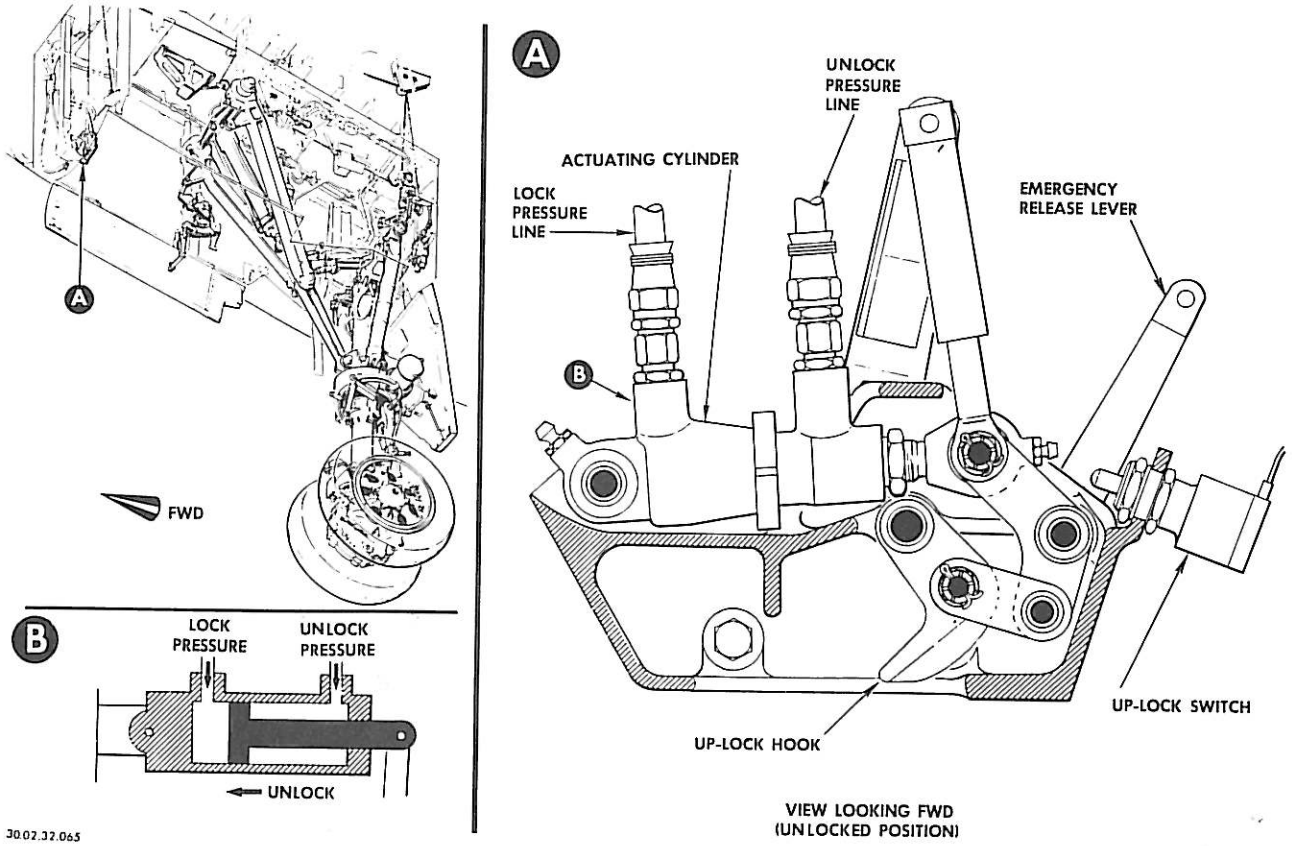
E



GEAR DOWN—DOORS CLOSED

22.30.32.008-2 A

spring latches automatically lock them closed. When the doors are manually closed, a check must be made to ensure that the up-lock cam (R/H door) and roller bracket (L/H door) fully engage. Also, the latch levers should be checked for full engagement with door actuating mechanisms.






Nose Landing Gear Door Up-Lock Mechanism
Figure 2

## NOSE LANDING GEAR (NLG) DOORS - MAINTENANCE PRACTICES

1. Removal/Installation NLG Doors (see Figure 201)

   A. Equipment Required - None.

   B. Remove NLG Doors.

      (1) Release ground access latches and open NLG doors.

      WARNING: WHEN OPERATING LATCH LEVERS, HOLD DOORS AND LOWER THEM SLOWLY TO PREVENT POSSIBLE INJURY TO PERSONNEL.

      (2) Disconnect door link from NLG door.

      (3) Remove two cotter pins, washers, and hinge pins; remove NLG door.

   C. Install NLG Door.

      (1) Hold door in position and install hinge pins and washers. Insert cotter pin in the end of each hinge pin.

      (2) Trim edges of door as required to obtain 0.060 (+0.000, -0.030)-inch gap between door and fuselage skins.

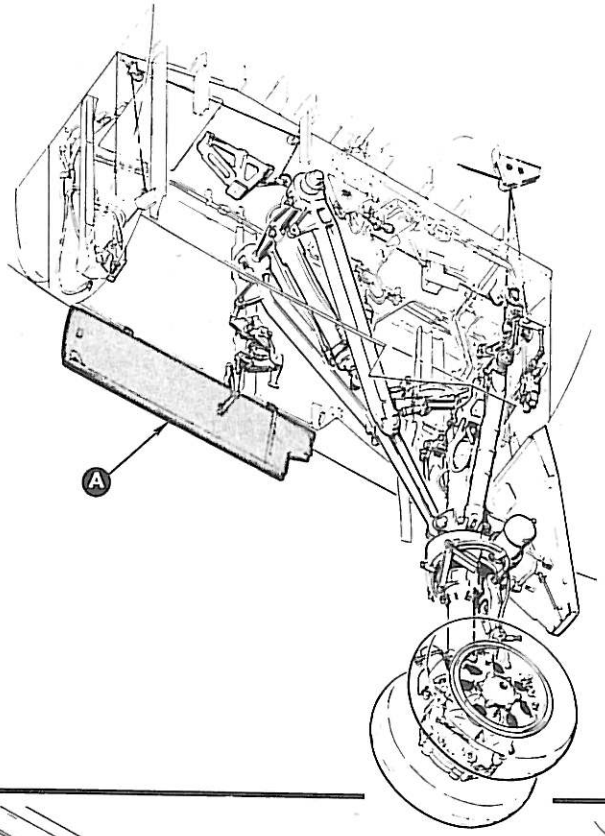
      (3) Connect door link to NLG door. Secure nut with cotter pin.

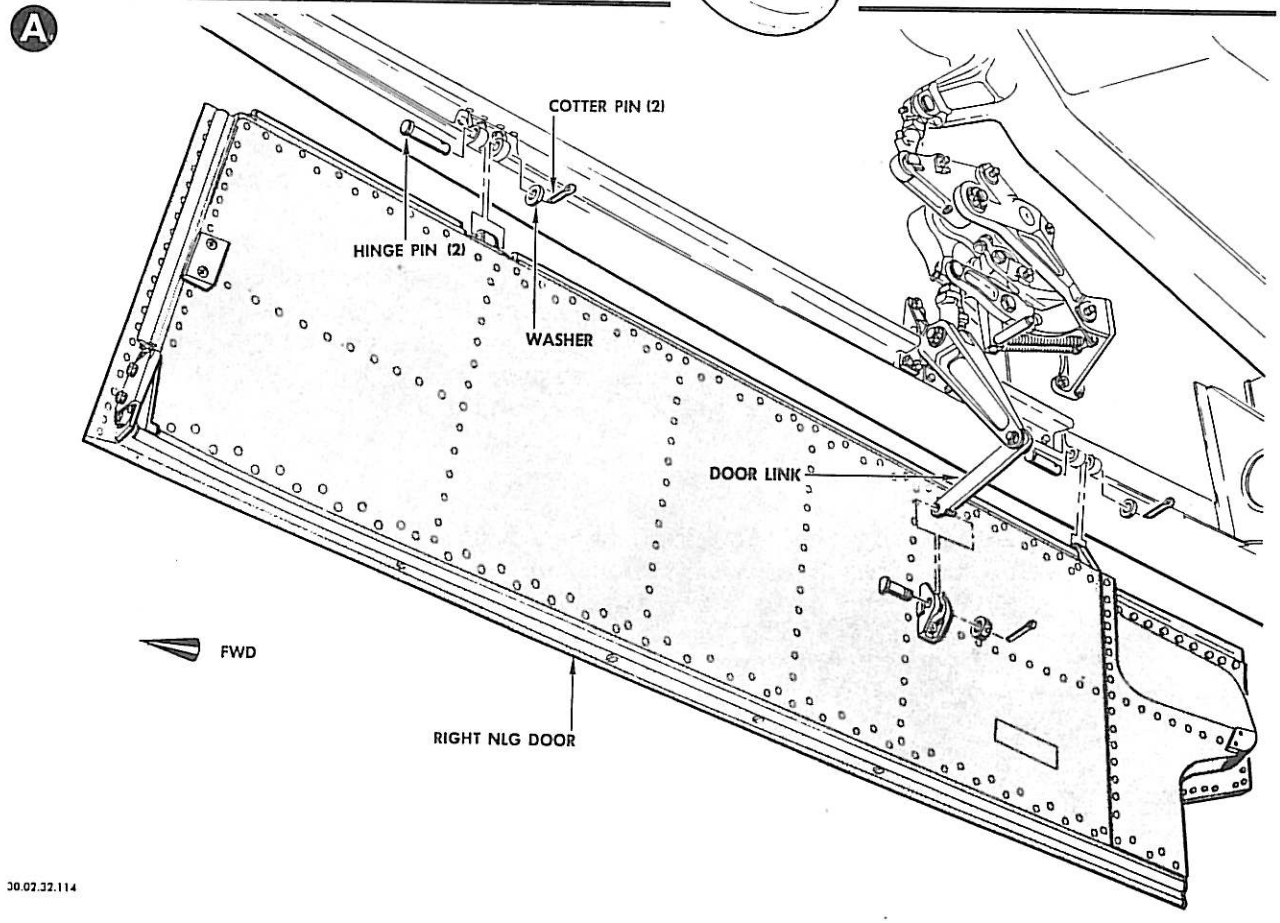
      (4) Perform Adjustment/Test Nose Landing Gear (refer to 32-3-0).

      NOTE: If only the NLG doors have been replaced and no other rigging or adjustment has been changed, adjustment can be accomplished per 32-3-0, steps 2.C.(1), 2.C.(3), 2.C.(5), 2.D.(13)(d) thru 2.D.(13)(j), 2.D.(13)(m), 2.D.(13)(n), and 2.D.(14) thru 2.D.(14)(j). Operation can be checked per 32-0, steps 2.C.(4) thru 2.C.(13), 2.D.(5) thru 2.D.(5)(d) 9), 2.D.(6)(b) thru 2.D.(6)(c) 5) (excluding control lever force checks), 2.E.(3) and 2.E.(5) (five cycles minimum), 2.I.(1), and 2.I.(3) thru 2.I.(5).

   D. Closing NLG Doors.

      (1) When closing the nose landing gear doors after they have been manually opened on the ground, observe the following items to be sure that the doors will function properly with the gear:






Nose Landing Gear Door Installation
Figure 201

(a) The door up-lock cam on RH door and the roller bracket on LH door must fully engage. Cam and bracket are located at the forward edge of the doors.

(b) Doors must be pushed up to the latched position.

(c) Manually return door mechanism latch levers to the full latched position.

NOTE: If the latch levers are not fully latched, the doors may remain open when the gear is retracted.

## NOSE LANDING GEAR (NLG) DOOR MECHANISM - MAINTENANCE PRACTICES

1. Removal/Installation NLG Door Mechanism (see Figure 201)

A. Equipment Required - None.

B. Remove NLG Door Mechanism.

(1) Release ground access latches and open NLG doors.

WARNING: WHEN OPERATING LATCH LEVERS, HOLD DOORS AND LOWER THEM SLOWLY TO PREVENT POSSIBLE INJURY TO PERSONNEL.

(2) Disconnect lower link between the hinge beam and the walking beam, by removing cotter pin, nut, washer, and bolt.

(3) Disconnect upper link from NLG drag brace by removing safety wire, nut, washer, and bolt.

(4) Remove four mounting bolts and washers connecting NLG door mechanism to side of wheel well.

(5) Gain access to the NLG door mechamism pivot bolt through the electrical "tunnel" compartment access door. Cut safety wire and remove pivot bolt nut and washer(s); remove NLG door mechanism and pivot bolt spacer.

NOTE: If desired, the hinge beam and door link may be removed as illustrated in Figure 201.

C. Install NLG Door Mechamism.

(1) Place NLG door mechamism in position and start pivot bolt through support fitting.

(2) In tunnel area, place spacer in position between support fitting and structure.

(3) Push pivot bolt through spacer and structure. Install washer and pivot bolt nut.

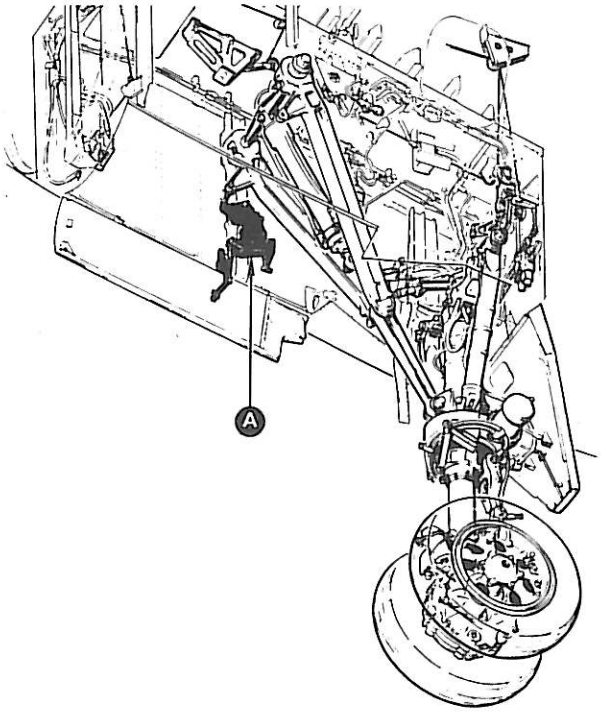
NOTE: If necessary, it is permissible to add one or two AN960-2016L washers between pivot bolt washer and structure.

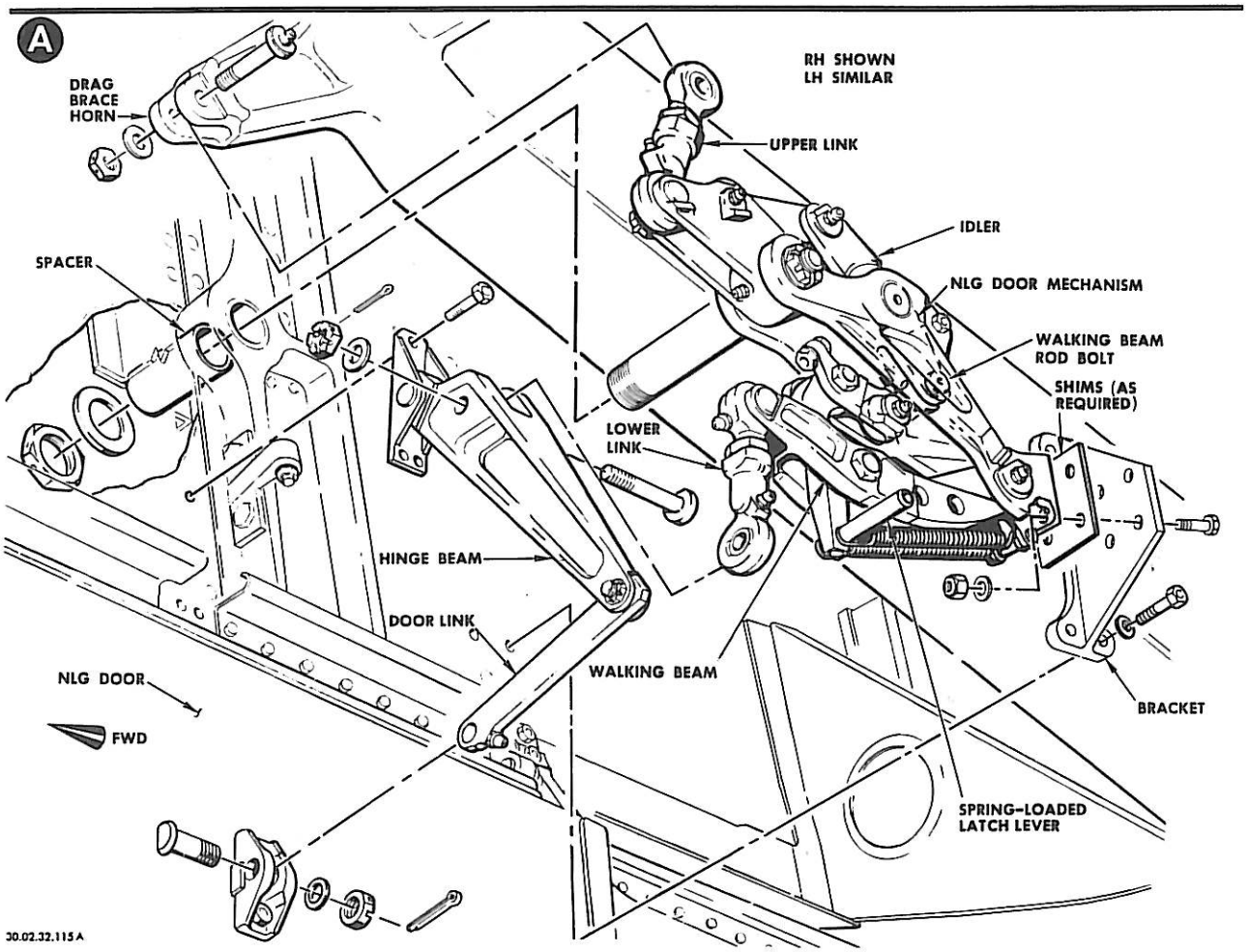
(4) Torque pivot bolt nut 500 to 600 inch-pounds and safety-wire to structure.

(5) Install bolts and washers attaching aft portion of the door mechamism to side of nose wheel well.

NOTE: Vary shim thickness between aft end of door mechanism and bracket, as required, to fit door mechanism to wheel well structure.

(6) Reconnect upper link between drag brace and door mechanism.






Nose Landing Gear Door Mechanism Installation
Figure 201

(7) Reconnect lower link between walking beam and hinge beam.

NOTE: All castle nuts in the NLG door mechanism, plus the idler-to-walking beam rod bolt and the upper link-to-drag brace bolt are torqued 5 to 10 inch-pounds. Castle nuts are secured with cotter pins and the walking beam rod bolt and the upper link assembly bolt are safety wired.

(8) Perform Adjustment/Test Nose Landing Gear (refer to 32-3-0).

NOTE: If only the NLG door mechanisms have been replaced and no other rigging or adjustment has been changed, adjustment can be accomplished per 32-3-0, steps 2.C.(1), 2.C.(5), and 2.D.(14) thru 2.D.(14)(j). Operation can be checked per 32-0, steps 2.C.(4) thru 2.C.(13), 2.D.(5) thru 2.D.(5)(d) 9), 2.D.(6)(b) thru 2.D.(6)(c) 5) (excluding control lever force checks), 2.E.(3) and 2.E.(5) (five cycles minimum), 2.I.(1), and 2.I.(3) thru 2.I.(5).

## NOSE LANDING GEAR (NLG) DOOR UP-LOCK - MAINTENANCE PRACTICES

1. Removal/Installation NLG Door Up-Lock (see Figure 201)

   A. Equipment Required - None.

   B. Preparation.

      (1) Reduce hydraulic pressure to 0 psig (refer to Chapter 12, SERVICING).

      (2) Open and attach warning tags to the following circuit breakers, on main circuit breaker panel:

      LANDING GEAR POS & WARN.

      HYD PUMP MOTOR CONT.

      (3) Release NLG door ground access latches and open NLG doors.

      WARNING: WHEN OPERATING LATCH LEVERS, HOLD DOORS AND LOWER THEM SLOWLY TO PREVENT POSSIBLE INJURY TO PERSONNEL.

   C. Remove NLG Door Up-Lock.

      (1) Disconnect hydraulic lines from door up-lock actuating cylinder.

      (2) Remove NLG door up-lock switch from door up-lock (refer to 32-10-8).

      (3) Disconnect emergency release cable and spring from lever on door up-lock by removing nut, washers, spacer, and bolt.

      (4) Remove four mounting bolts, washers, nuts, and shims; remove NLG door up-lock.

   D. Install NLG Door Up-Lock.

      (1) Place NLG door up-lock in position and secure with four mounting bolts, washers, and nuts.

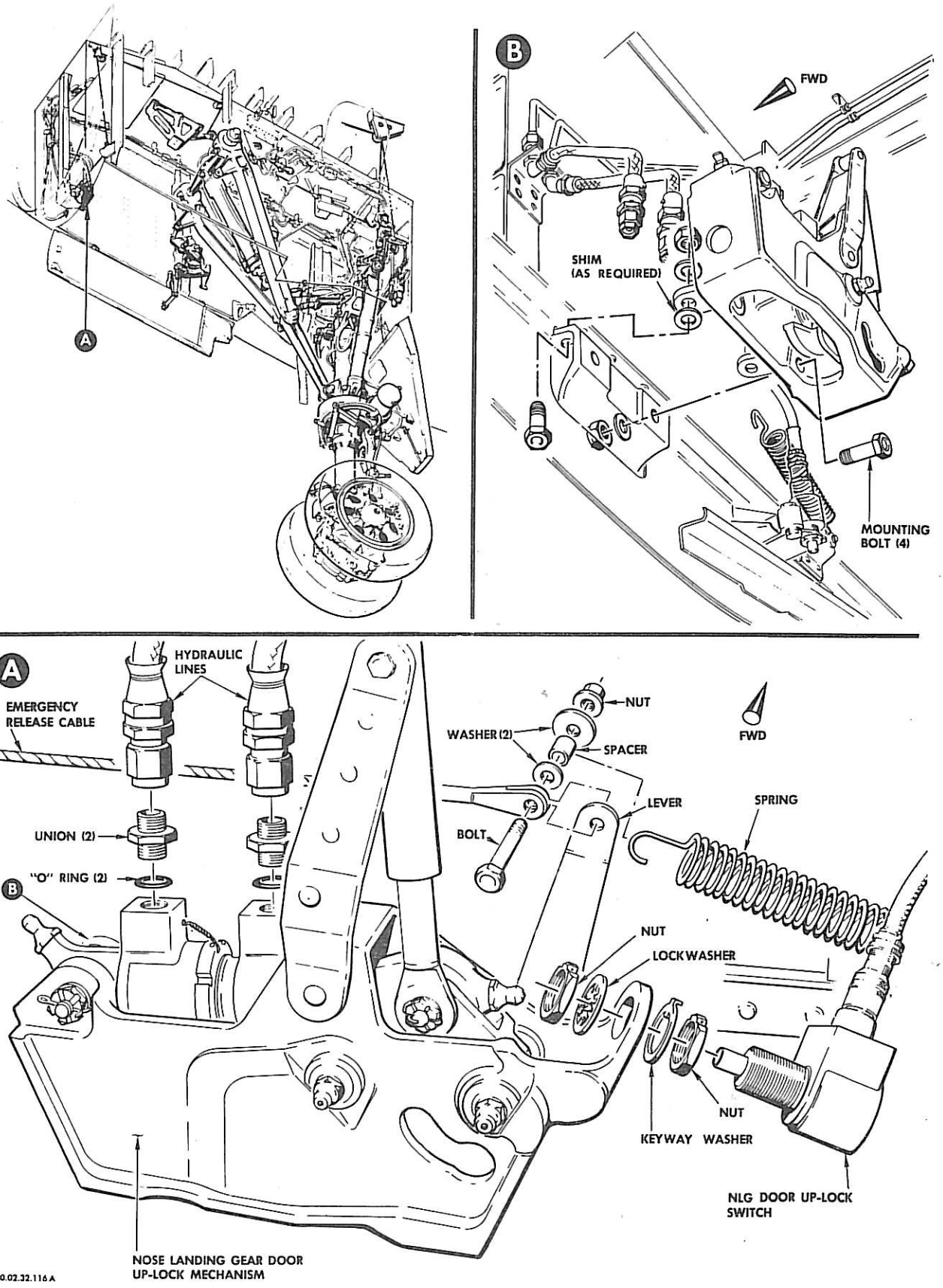
      NOTE: Use shims as required to fill gap between upper attach lugs of door up-lock and support bracket.

      (2) Connect emergency release cable and spring to lever on door up-lock with bolt, washers, spacer, and nut. Use large diameter washer under nut.

      (3) Connect hydraulic lines to NLG door up-lock actuating cylinder.

      (4) Install door up-lock switch on door up-lock (refer to 32-10-8).

      (5) Remove warning tags and close circuit breakers opened in step B.


A
B
FWD
SHIM
(AS REQUIRED)
MOUNTING
BOLT (4)
HYDRAULIC
LINES
EMERGENCY
RELEASE CABLE
UNION (2)
"O" RING (2)
NUT
WASHER (2)
SPACER
FWD
LEVER
SPRING
BOLT
NUT
LOCKWASHER
NUT
KEYWAY WASHER
NLG DOOR UP-LOCK
SWITCH
NOSE LANDING GEAR DOOR
UP-LOCK MECHANISM
30.02.32.116 A

(6) Perform Adjustment/Test Nose Landing Gear (refer to 32-3-0) and check installation for hydraulic leaks.

NOTE: If only the NLG door up-lock has been replaced and no other rigging or adjustment has been changed, adjustment can be accomplished per 32-3-0, steps 2.C.(1), 2.C.(3), 2.C.(5), and 2.D.(13) thru 2.D.(14)(j). Operation can be checked per 32-0, steps 2.C.(4) thru 2.C.(13), 2.D.(5) thru 2.D.(5)(d) 9), 2.D.(6)(b) thru 2.D.(6)(c) 5) (excluding control lever force checks), 2.E.(3) and 2.E.(5) (five cycles minimum), 2.I.(1), and 2.I.(3) thru 2.I.(5).

(7) Deleted.

(8) Deleted.

## NOSE LANDING GEAR (NLG) FAIRING - MAINTENANCE PRACTICES

1. Removal/Installation NLG Fairing (see Figure 201)

   A. Equipment Required - None.

   B. Remove NLG Fairing.

      (1) With NLG in the down-and-locked position, disconnect emergency brake vent line from vent tubing on fairing.

      (2) Disconnect the two NLG fairing links from NLG fairing.

      (3) Gain access to the fairing-to-fuselage attachment points behind the NLG shock strut near the bottom of the wheel well aft bulkhead.

      (4) Remove two cotter pins, nuts, washers, and bolts connecting fairing to fuselage; remove NLG fairing.

   C. Install NLG Fairing.

      (1) Position fairing in slots in fuselage and install bolts, washers, and nuts. Tighten nuts fingertight and secure with cotter pins.

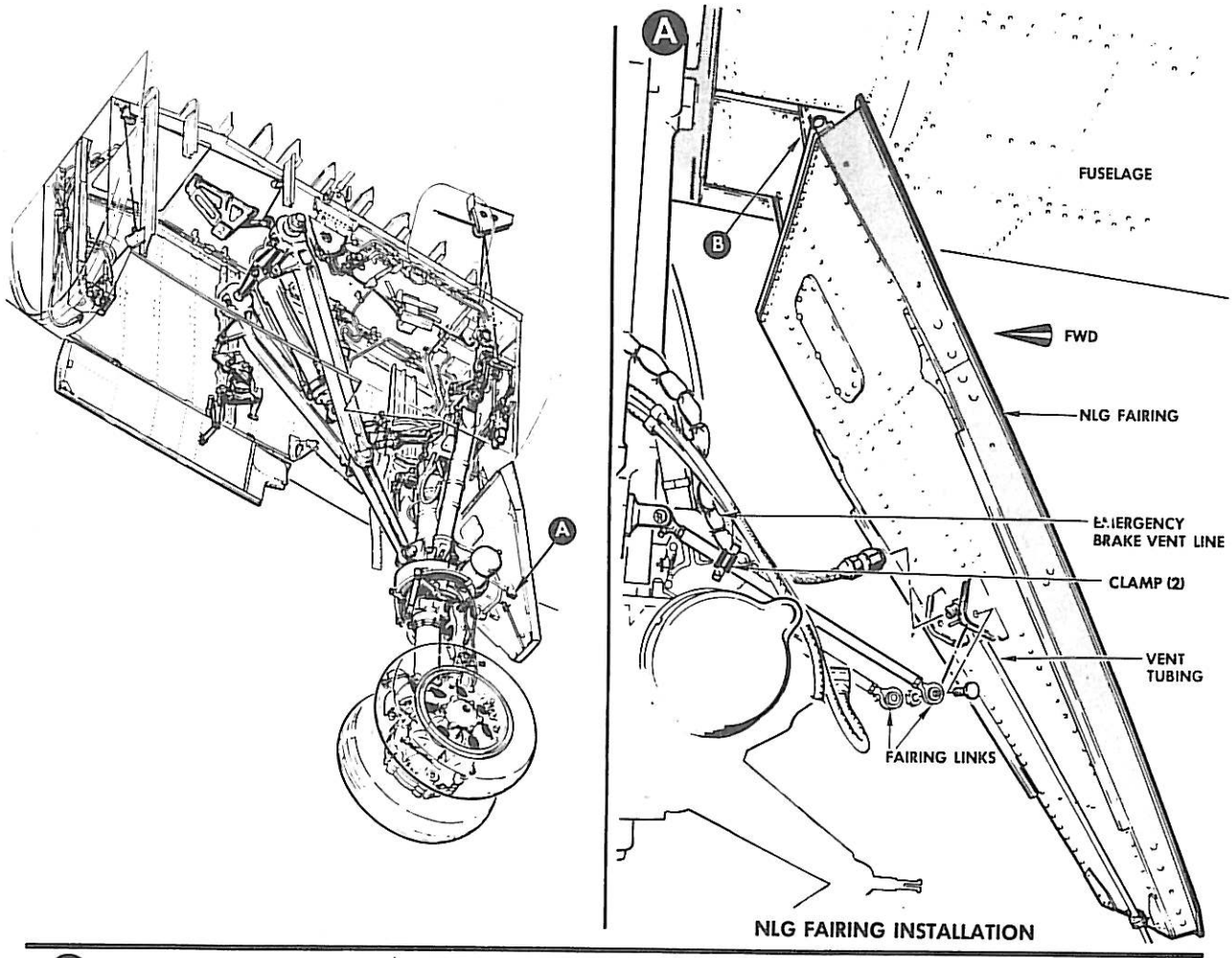
      (2) Extend fairing links to maximum length and temporarily connect to the NLG fairing.

      (3) Connect emergency brake vent line to vent tubing on fairing.

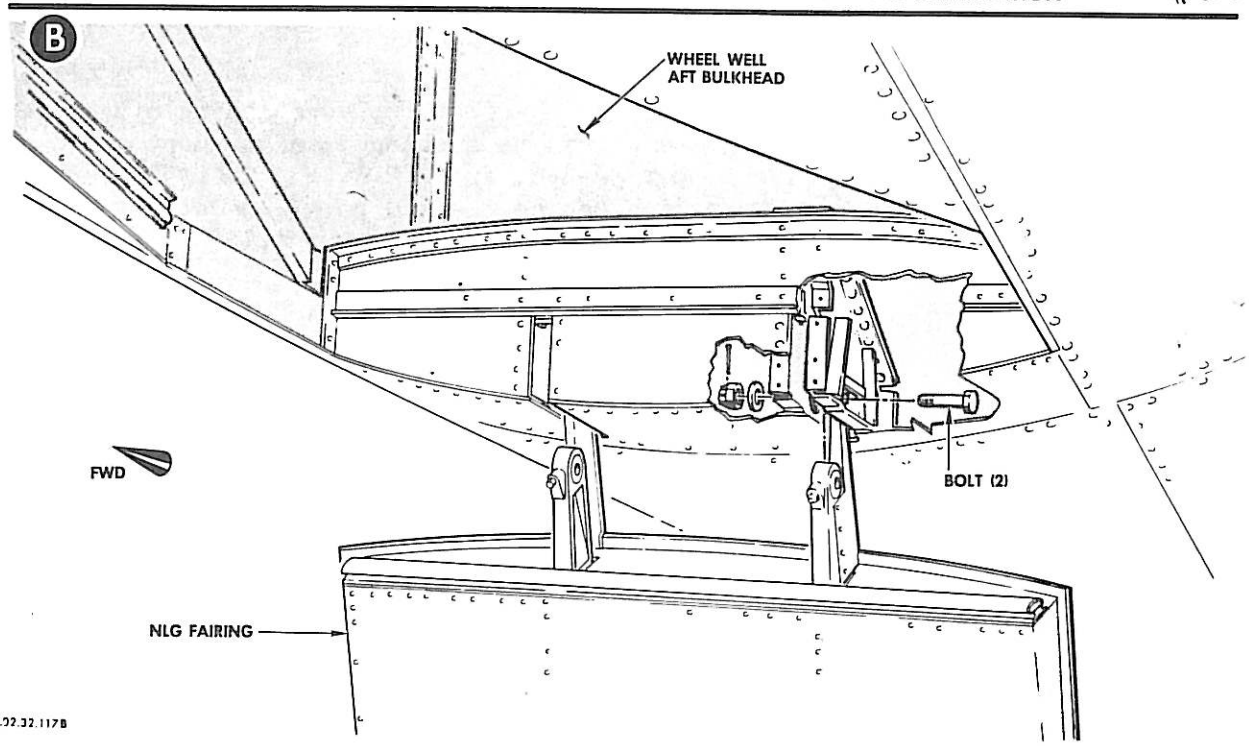
      (4) Perform Adjustment/Test Nose Landing Gear (refer to 32-3-0). Trim edges of fairing as required to obtain 0.060 (+0.000, -0.030)-inch gap between fairing and fuselage skins.

      NOTE: If only the NLG fairing has been replaced and no other rigging or adjustment has been changed, adjustment can be accomplished per 32-3-0, steps 2.C.(1), 2.C.(5), and 2.D.(12). Operation can be checked per 32-0, steps 2.C.(4) thru 2.C.(13), 2.I.(1), and 2.I.(3) thru 2.I.(5).

      (5) Deleted.




NLG FAIRING INSTALLATION



# LANDING GEAR DOWN-LOCK INSPECTION WINDOWS AND INDICATORS - DESCRIPTION AND OPERATION

## 1. General

The nose landing gear (NLG) and main landing gear (MLG) down-locks can be visually checked in flight through a window in the forward bulkhead of the electronic compartment at fuselage sta 250, water line 31.25 and a window and mirror installation in the top of each main wheel well at fuselage sta 940, buttock line 5. Inflight access to the NLG down-lock inspection window is through a door in the cabin floor directly above the electronic compartment. Access to the MLG down-lock inspection windows and mirrors is gained by lifting the cabin aisle carpeting and pad at fuselage sta 940 (eleven windows aft of the overwing emergency exits) and removing floor panel. Each of the down-lock inspection windows is sealed to prevent cabin air pressure leakage and is removable. The NLG down-lock inspection window is held in place with eight bolts and wing nuts; a turnlock fastener and hinge secure each of the MLG down-lock inspection windows in place.

The NLG jury brace (see 32-3-0, Figure 2) is locked when the white stripes, with international orange background are aligned on the aft side of the jury brace latch mechanism. Each MLG has a visual down-lock indicator on the jury brace (see 32-1-0, Figure 3) which is visible through the window and mirror in the top of the wheel well. The MLG is down and locked when the white stripes with international orange background are aligned on the movable flag portion of the indicator and the fixed arrow flag.

## NOSE LANDING GEAR (NLG) DOWN-LOCK INSPECTION WINDOW - MAINTENANCE PRACTICES

1. Removal/Installation NLG Down-Lock Inspection Window (see Figure 201)

   A. Equipment Required - None.

   B. Remove NLG Down-Lock Inspection Window.

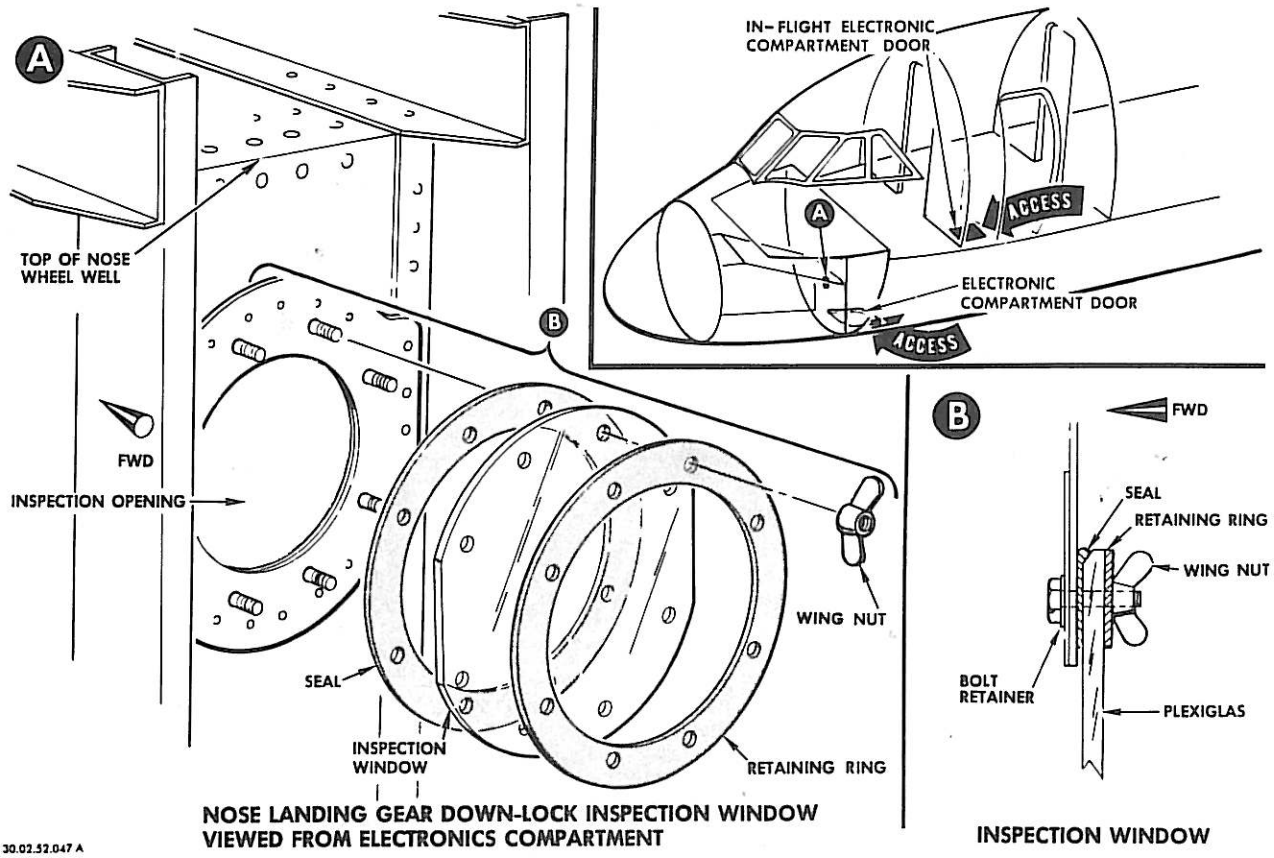
      (1) Gain access to NLG down-lock inspection window through the electronic compartment door.

      (2) Remove eight wing nuts securing retaining ring, plexiglas window, and seal to electronic compartment forward bulkhead; remove retaining ring, window, and seal from opening.

   C. Install NLG Down-Lock Inspection Window.

      (1) Place seal, plexiglas window, and retaining ring over bolts sticking through forward bulkhead of electronic compartment.

      (2) Install eight wing nuts securing retaining ring, window, and seal to bulkhead.

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NOSE LANDING GEAR DOWN-LOCK INSPECTION WINDOW VIEWED FROM ELECTRONICS COMPARTMENT

INSPECTION WINDOW

## MAIN LANDING GEAR (MLG) DOWN-LOCK INSPECTION WINDOWS AND MIRRORS - MAINTENANCE PRACTICES

1. Removal/Installation MLG Down-Lock Inspection Windows (see Figure 201)

   A. Equipment Required - None.

   B. Preparation.

      (1) Lift cabin aisle carpeting and pad at fuselage sta 940 (eleven windows aft of the overwing emergency exits).

      (2) Remove cabin aisle floor panel above MLG down-lock inspection windows.

   C. Remove MLG Down-Lock Inspection Window.

      (1) Release turnlock fastener at forward edge of window assembly.

      (2) Remove two cotter pins securing hinge pin in hinge at aft edge of window assembly; remove hinge pin and window assembly from top of main wheel well.

      (3) Remove twelve screws securing ring and seal to underside of window assembly; remove ring and seal.

      (4) Remove eight screws and nuts securing retaining ring, plexiglas window, and seal to upper side of window assembly; remove retaining ring, plexiglas window, and seal.

   D. Install MLG Down-Lock Inspection Window.

      (1) Place seal, plexiglas window, and retaining ring on upper side of window assembly and align screw holes; install eight screws and nuts.

      NOTE: Screw heads must face downward.

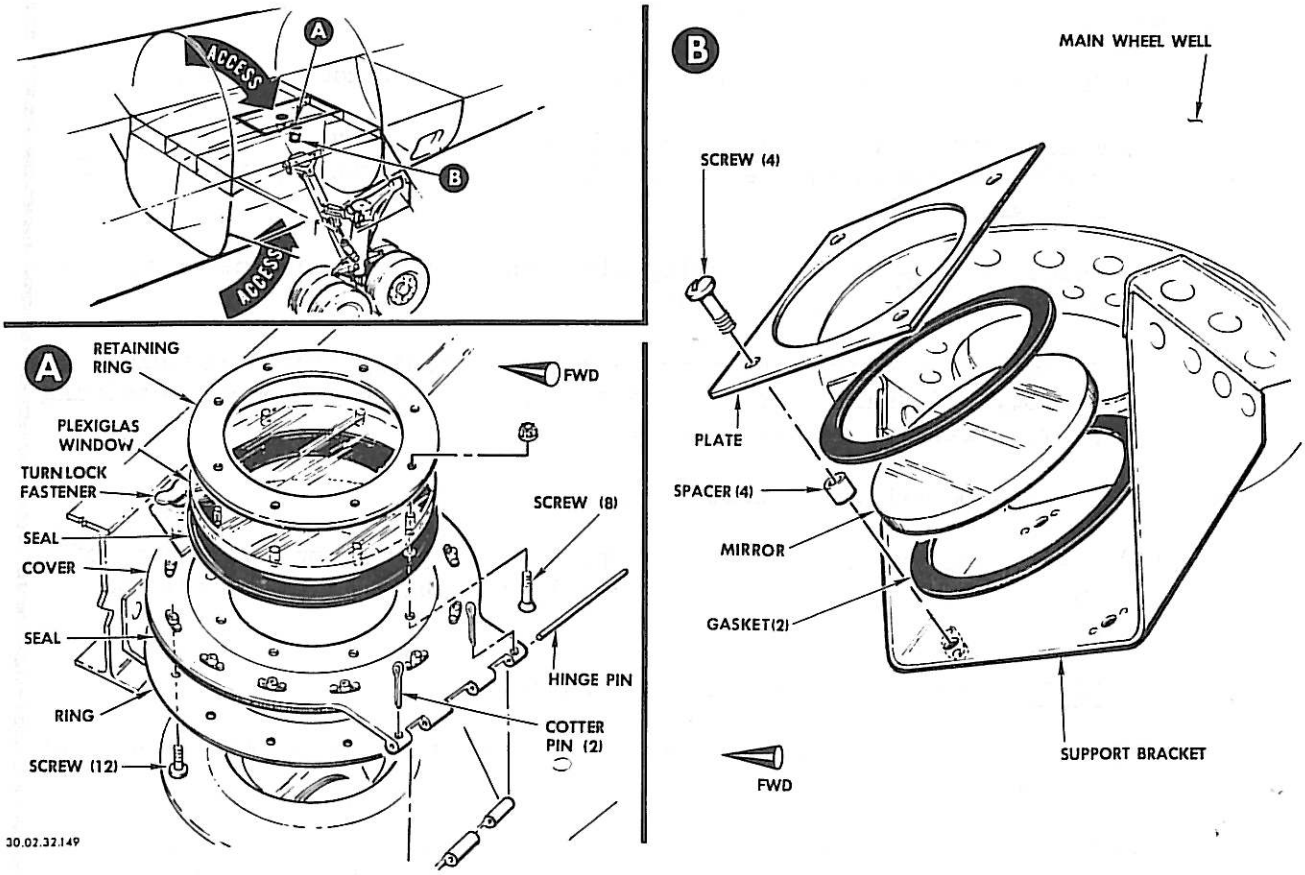
      (2) Place seal and ring on underside of window assembly and align screw holes; install twelve screws.

      (3) Place window assembly over opening in top of main wheel well and align hinge halves; install hinge pin and secure with two cotter pins.

      (4) Secure turnlock fastener at forward edge of window assembly.

      (5) Install cabin aisle floor panel (refer to Chapter 53, FUSELAGE).

      (6) Secure aisle carpeting and pad (refer to Chapter 25, EQUIPMENT/FURNISHINGS).






Main Landing Gear Down-Lock Inspection
Window and Mirror Installation
Figure 201

2. Removal/Installation MLG Down-Lock Inspection Mirrors (see Figure 201)

A. Equipment Required - None.

B. Preparation. Operate ground access handle in hydraulic compartment to release MLG door up-locks; manually open MLG doors.

C. Remove MLG Down-Lock Inspection Mirror.

(1) Gain access to mirror installation in top of main wheel well.

(2) Remove four screws and spacers securing plate, mirror, and gaskets to support bracket; remove plate, mirror, and gaskets.

D. Install MLG Down-Lock Inspection Mirror.

(1) Place gasket on each side of mirror and position mirror in support bracket.

(2) Align plate with nutplates in bracket; secure plate and mirror to support bracket with four screws and spacers.

(3) Lift cabin aisle carpeting and pad at fuselage sta 940 (eleven windows aft of the overwing emergency exits).

(4) Remove aisle floor panel above MLG down-lock inspection windows and check that MLG down-lock indicator on jury brace is visible through down-lock inspection window.

NOTE: Align mirror with MLG down-lock indicator by loosening and tightening mirror opposing attachment screws.

(5) Install cabin aisle floor panel (refer to Chapter 53, FUSELAGE).

(6) Secure aisle carpeting and pad (refer to Chapter 25, EQUIPMENT/ FURNISHINGS).

(7) Pressurize No. 2 hydraulic system (refer to Chapter 29, HYDRAULIC POWER).

(8) Close MLG doors and return ground access handle to normal (forward) position.